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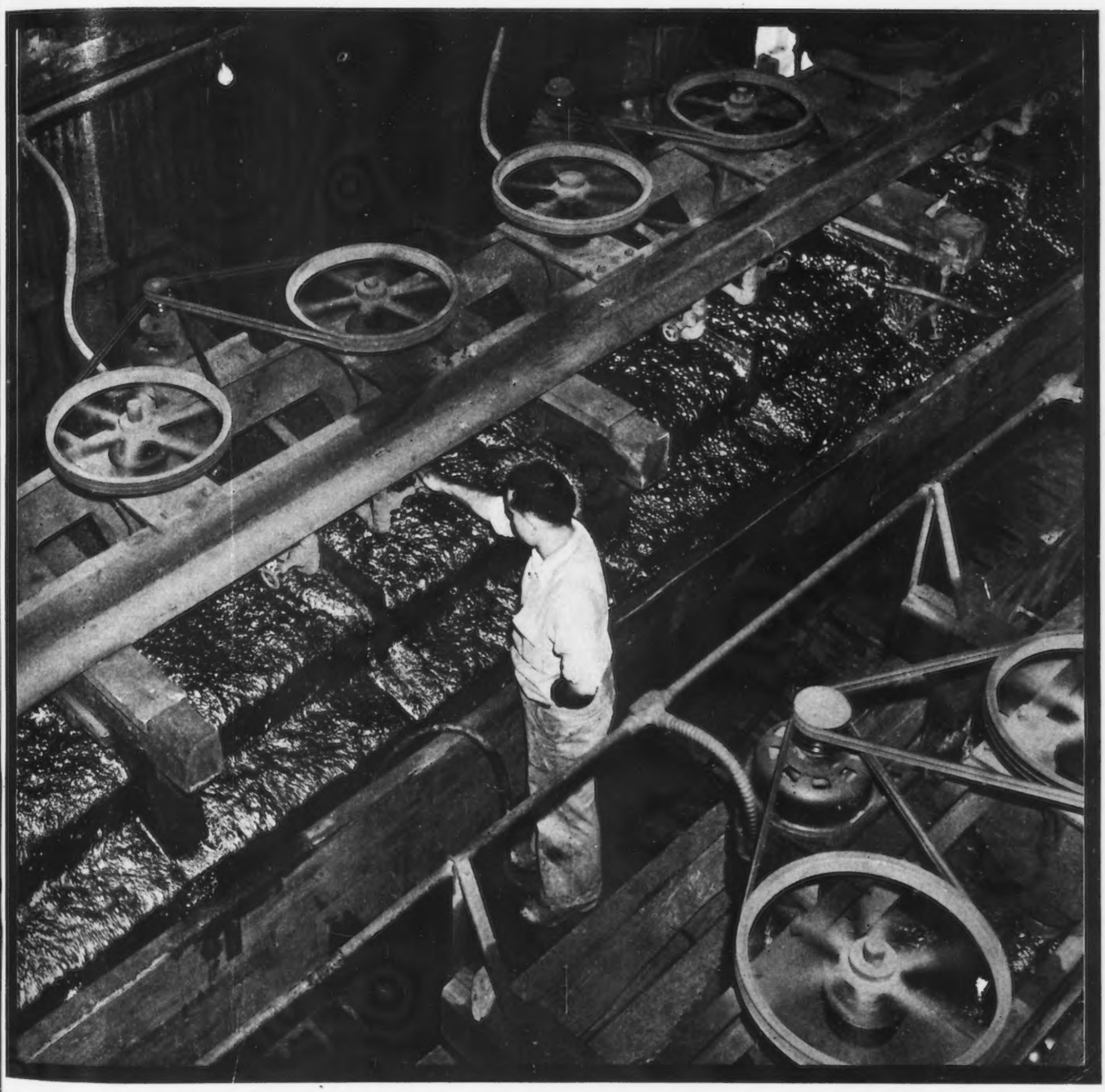

Copper flotation cleaner cells in Magma mill, where new flowsheet has been worked out. See page 68

The Premium Price Plan—Its Cost and Results—Page 72

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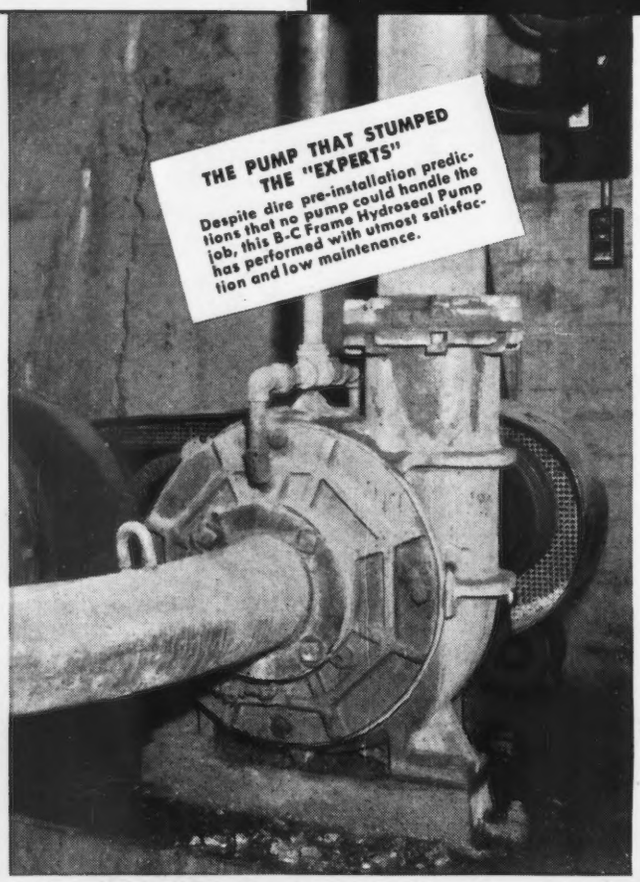
Hydroseal Pump At Northwest Magnesite Doing The "Impossible" And Doing It Well


THE PUMP THAT STUMPED THE "EXPERTS"
Despite dire pre-installation predictions that no pump could handle the job, this B-C Frame Hydroseal Pump has performed with utmost satisfaction and low maintenance.

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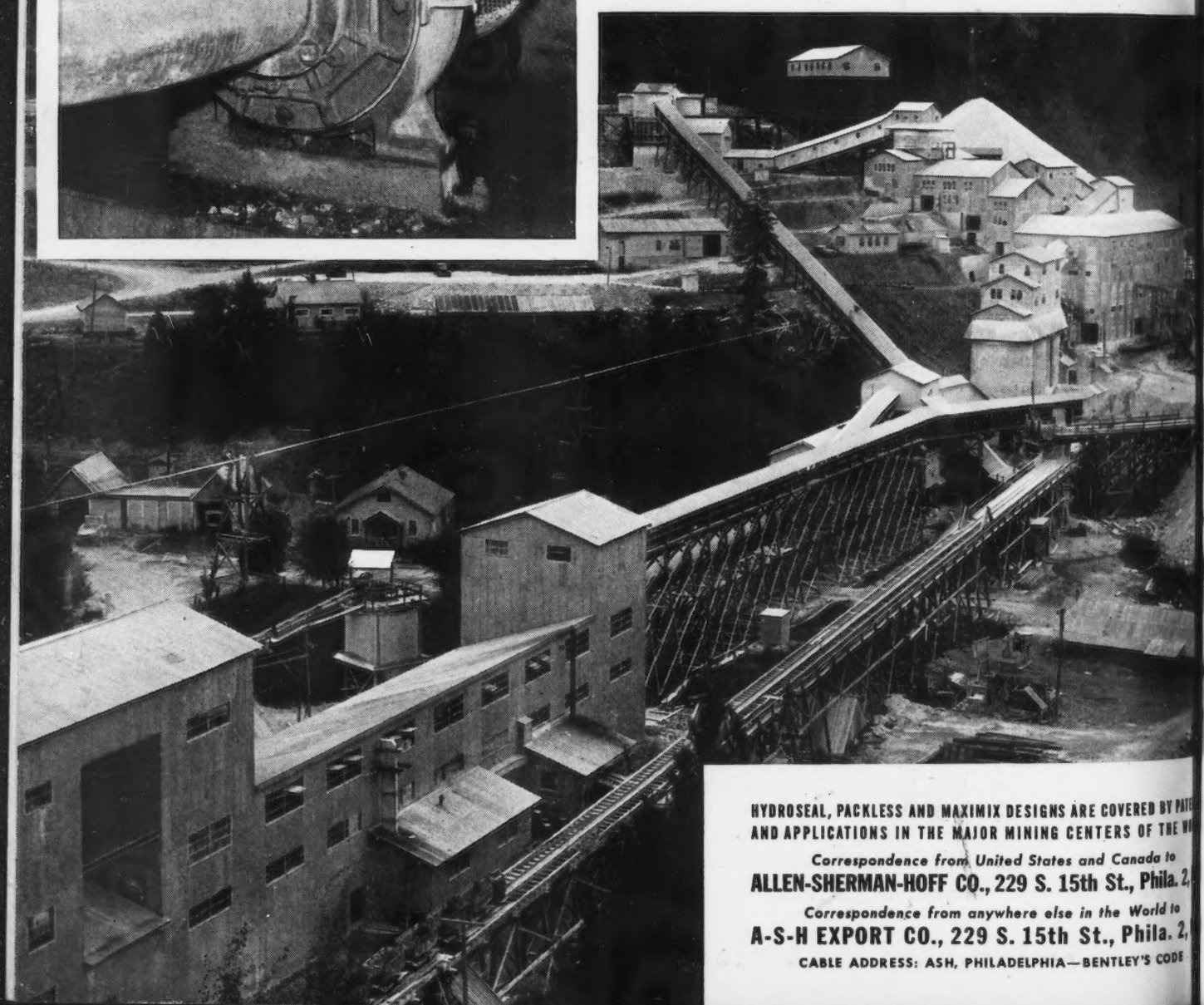
*The complete story of this appeared in the December, 1947 issue of Mining World.



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Volume 149 **Number12**

A McGRAW-HILL PUBLICATION

McGRAW-HILL PUBLISHING COMPANY, INC.

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Publication office: 210 S. Desplaines St., Chicago 6, Ill. Editorial and Executive Offices: 330 West 42nd St., New York 18, N. Y. Cable address: McGraw-Hill, New York, Branch Offices: San Francisco 4, 68 Post St.; Chicago 11, 520 N. Michigan Ave.; Los Angeles 14, Pacific Finance Bldg.; Washington, D. C., National Press Bldg.; Pittsburgh 22, 738-9 Oliver Bldg.; Detroit 26, 2980 Penobscot Bldg.; Cleveland 15, 1510 Hanna Bldg.; Boston 16, 1427 Statler Bldg.; Philadelphia 3, 17th & Sansom Sts.; Atlanta 3, 1011 Rhodes-Haverty Bldg.; St. Louis 8, Continental Bldg. District Managers: New York, T. E. Alcorn, F. W. Roets; Philadelphia, W. A. Potter; Cleveland, W. M. Spears; Pittsburgh, H. C. Chellson; Chicago, C. J. Coash and G. A. Mack, San Francisco, J. W. Otterson; Atlanta, R. C. Maultsby; Los Angeles, C. W. Dysinger, London address: McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C. 2, England. Cable address: Backlash Estrand, London. Other McGraw-Hill foreign news offices in Paris, Berlin, Moscow, Prague, Shanghai, Bombay and Mexico City.

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Subscription Information

ENGINEERING AND MINING JOURNAL, December, 1948, Vol. 149, No. 12. Published monthly at Chicago, Ill. Return postage guaranteed. Subscription rates: United States and possessions $3 a year, $4 for 2 years, $5 for 3 years. Canada $4 a year, $6 for 2 years, $8 for 3 years. Pan American countries $5 a year, $8 for 2 years, $10 for 3 years. Elsewhere $15 a year, $25 for 2 years, $30 for 3 years. Please indicate position and company connection in all subscription orders. Price of this issue, 50 cents. Entered as second class matter August 16, 1948, at the post office at Chicago, Ill., under the Act of March 3, 1879.

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ENGINEERING AND MINING JOURNAL

DECEMBER, 1948

The Color of the Future

RETURN OF THE DEMOCRATIC PARTY to full power in Washington obviously requires the metal mining industry to abandon its hopes for easy establishment of a realistic attitude toward mining on the part of the Government. It does not, however, make that goal unattainable.

For example, where the industry had hoped for early revision of the tax structure in order to provide incentive for investment of capital in new mining enterprises, it now hears talk of even higher taxes for corporations. Mining companies must therefore prepare for the strongest of battles to get tax schedules that will encourage, not stifle, a healthy industry.

In the labor field, unions are, of course, calling for delivery of President Truman's promise to do something about the Taft-Hartley law. They would make it appear that the Democratic party is committed to unmitigated repeal of the law, which is not at all the case. A study of Truman's experience with the law, and of his statements concerning it, indicates that he may favor repeal of Taft-Hartley, but not a return to the old days of the Wagner Act and unrestricted union bossism.

Mining companies have an obligation here to join with other industrial management to work with Government and labor to get the best labor legislation written that the circumstances permit. Management should remember how damaging it was to the unions' case when not a single union leader offered a constructive suggestion when Congress was hammering out the Taft-Hartley Act. All concerned should remember, too, that the Democratic victory can by no means be considered smashing, and that Truman is in the White House by only a narrow margin.

There are other fields in which the mining industry will have to fight harder than was expected to get the fair deal to which it is entitled. However, one should not let concern over that fact blind him to the vastly more important fact of the basic soundness of the industry's position. The world-wide demand, and real need, for metals continues unabated. One can foresee a slackening in this demand only if the cold war in Europe were to chill completely and our stockpiling and armament programs were to lose their urgency. Actually, metal producers would welcome some easing in demand, because the present upward pressure on metal markets is altogether too strong for comfort.

All in all, the color of the future for mining is bright, not as brilliant as we had hoped perhaps, but still strong enough to light clearly the way ahead.

Premiums Deserve Study

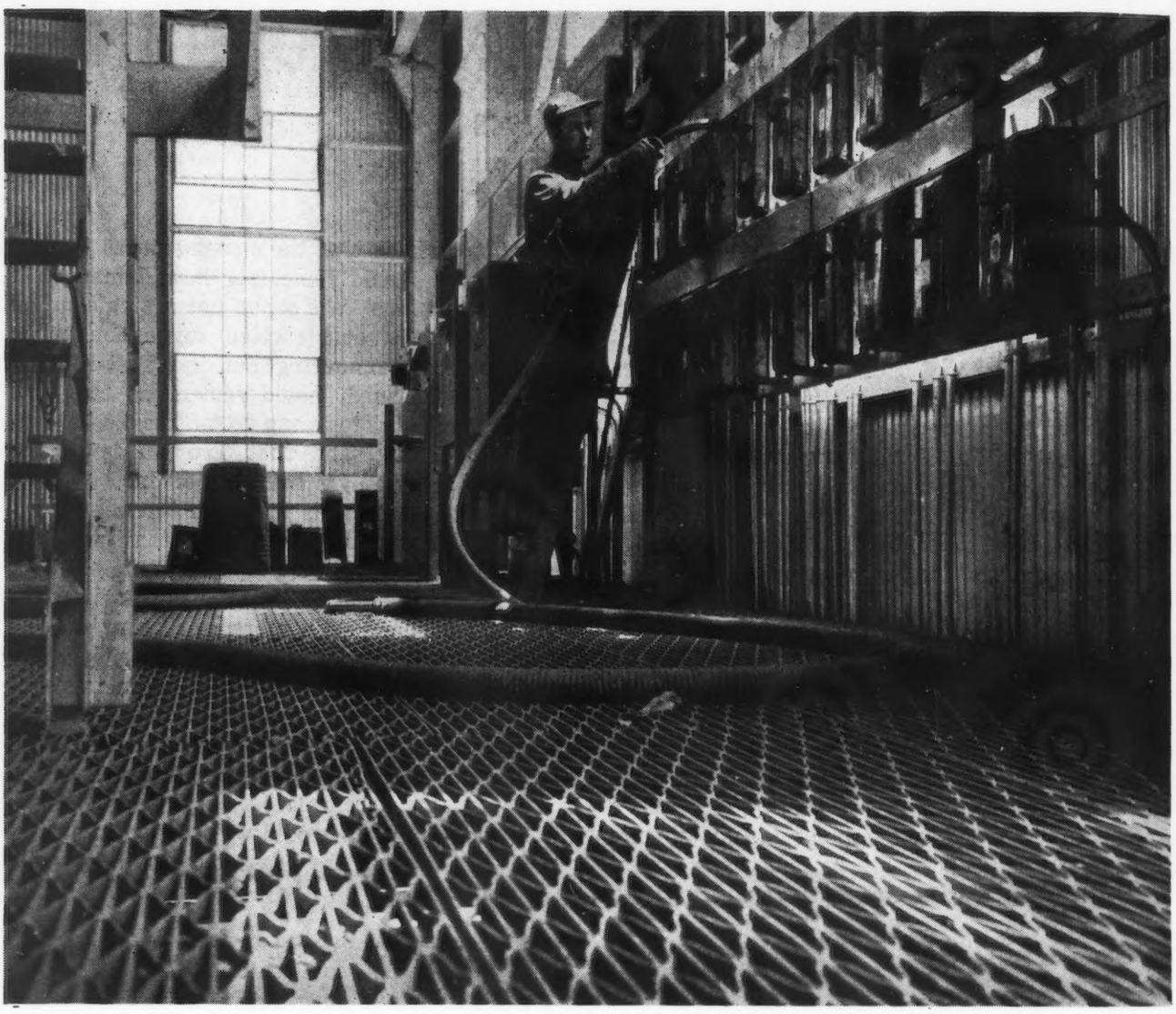
MOST OF THE MANY DISCUSSIONS of the successes or failures of the Premium Price Plan have been based largely on an emotional or economic bias of one kind or another. This is not necessarily the fault of the parties to the discussions, but is owing, in part at least, to the lack of widespread publication of the information on which an unbiased evaluation of the Plan's performance might be based.

That is one reason why we are glad to be able to publish in this issue a condensation of the study of the Premium Price Plan recently completed by Messrs. Olund and Gustavson of the U. S. Bureau of Mines. We hope to be able to follow their wholly factual account of the Plan with an analysis and interpretation of it in an early issue.

Our purpose in doing so will be simply to present material that can be used as a guide in case it ever becomes necessary, in some future emergency, to consider reviving an incentive program to increase production of metals. We will not set out to prove a case either for or against payment of subsidies to metal producers.

We are against, in principle, the payment by Government of subsidies to the producer of any commodity the production of which under normal conditions would be uneconomic unless so subsidized. Under a free enterprise system, there can be no valid excuse for such a subsidy, unless it can be demonstrated that the national interest, in an emergency, requires it.

The question in our minds is: If the national interest requires Government assistance to marginal producers of metals in order to get maximum production, what form should this assistance take? Are subsidies preferable, or should prices be allowed to climb freely and the profits of low-cost producers be taxed away? In the study we will present of the data Messrs. Olund and Gustavson compiled, we hope to find the answer.



VACUUM CLEANER IS USED BY CRUSHER OPERATOR, Ned Cross, to dust off the switch boxes in the new 1,500-ton concentrator of the Magma Copper Co. Note easily-cleaned grating floor. This type of construction is used throughout the new mill.

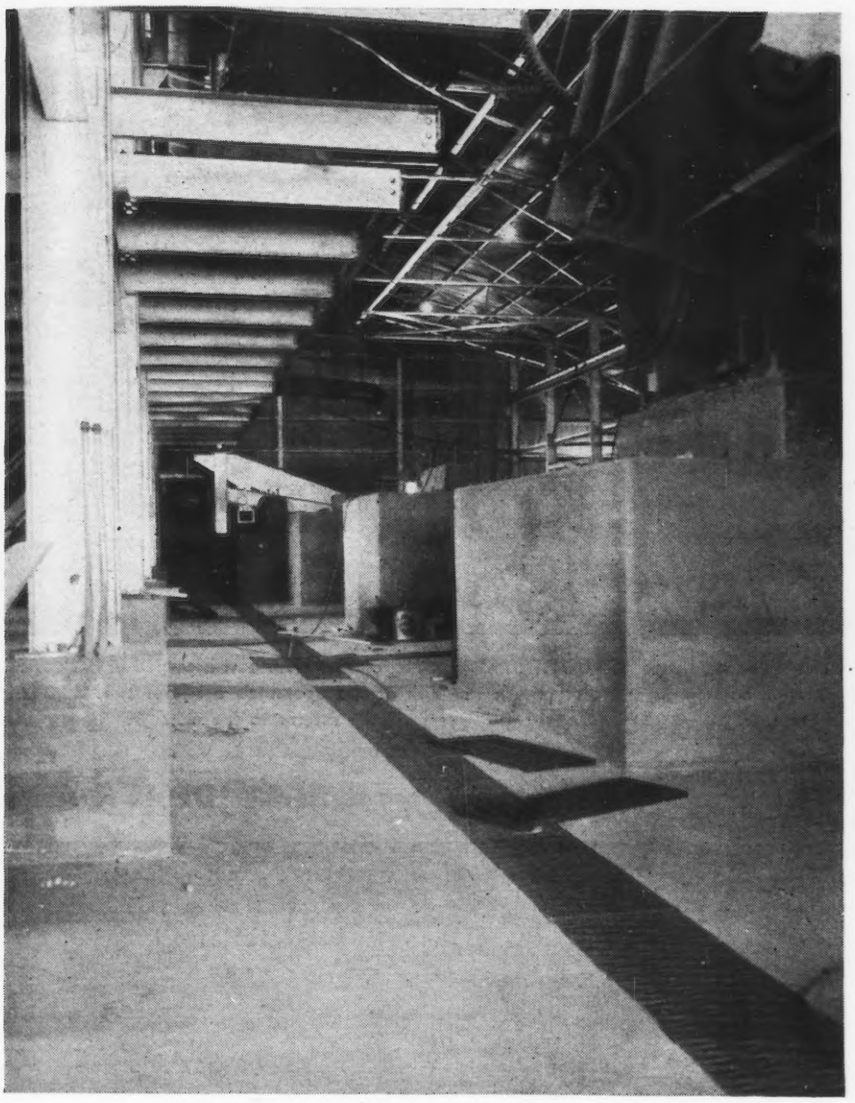
A Mill Designed For

HALDER J. REX, Mill Superintendent
Magma Copper Co., Superior, Arizona.

Comparison of Results at Magma With Old and New Flowsheets

Product	Average Assays, Percent Copper Old—1943	New—1947
Heads	5.227	6.439
Concentrate	14.252	30.665
Tails	0.252	0.185

Note: The improved results were obtained in the old mill with flowsheet to be used in new mill. Credit is given to better reagents and control and to re-grinding of rougher flotation concentrate.



SLOPING FLOOR AND CENTRAL TROUGH, draining to the sump, as shown in this view, make it easy to keep the grinding floor clean. Spilled pulp is returned.

Easier Operation

SEVERAL UNUSUAL FEATURES in mill design have been built into Magma Copper Co.'s new 1,500-ton concentrator at Superior, Ariz. Built to replace the old structure, which dates from 1914, the new plant will be running this fall.

Tables were combined with flotation in the old plant, which consisted of two 150-ton sections, plus a lead-zinc unit added in 1916 and converted to copper soon afterward.

During the 1921-22 shutdown, the mill was remodeled to include three sections of 200-tons each. At this time, run-of-mine ore was crushed in two open-circuit stages. A jaw crusher broke mine ore to 4 in., and two disks crushed the product to 1 in. In 1928, a 4-ft. Symons replaced the disks, and the tonnage per section went to 250 tons.

The mill flowsheet included two-stage grinding with tables between the stages. Table tails were reground and floated in a bank of Callow cells to make a rough concentrate. Table and flotation concentrates were combined and pumped to the smelter.

Agitair cells replaced the Callows in 1933, but the flowsheet was unchanged. In 1938, a new section was put into operation to treat copper-lead-zinc ore, and more flotation equipment was added. But as in the First World War, the strong demand for copper necessitated shifting this new section to copper production. By then the mill was treating 1,200 tons of copper ore daily.

Higher Grade Sought

In 1944 an effort was made to maintain a higher grade of concentrate. First the tables were removed, despite the objection that loss of coarse concentrate would slow down filtration and increase smelter dust loss. Actually, it soon became apparent that metallurgy had improved without the tables and repair costs decreased. In the final analysis, less insoluble in the concentrate aided filtration.

As results from this operation were encouraging, it was proposed that the old mill be used as a test plant. This was feasible then because of low tonnage owing to the shortage of miners. Various changes in flowsheet, conditioning, thickening, reagents and grind were tried, but the grade of concentrate still was not satisfactory. In the end, regrinding the rougher concentrate brought the desired results.

To establish the new flowsheet, major changes would be required in the old mill. This, plus the extreme deterioration of the old structure, resulted in a decision to build an entirely new mill.

New Crushing Plant

W. E. Meals, design engineer, and J. W. Thompson, consulting engineer, began planning the new crushing plant in 1945. It was completed by September, 1947, and began crushing ore for the old mill.

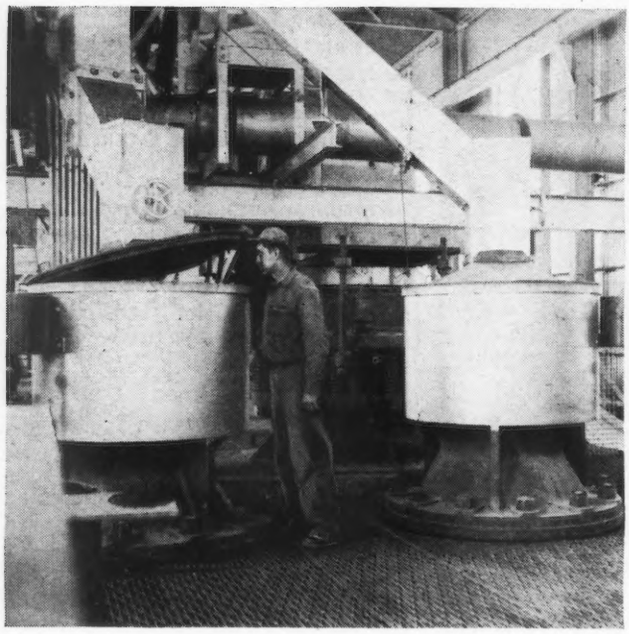
The plant uses three-stage crushing, as follows: Primary, an 18 x 36-in. Traylor jaw crusher; secondary, a Symons 4-ft. standard cone; tertiary, two Allis-Chalmers Type-R crushers. Screens include one TyRock double-deck for scalping and two single-deck Ripl-flo screens for finishing. Capacity of the plant is 200 tons per hour to minus ½-in.

Dings tramp-iron detectors protect the crushers, and an electrical interlock system controls the conveyor belt motors. Crushers, screens and belt transfer points are hooded for dust collection.

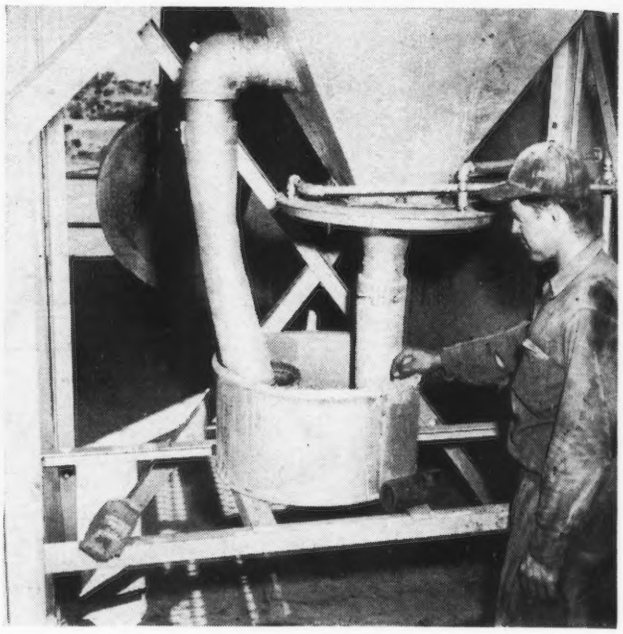
Operating features include: Removal of finished product by scalping screen after primary crushing stage; closed circuit between finishing screens and tertiary crushers to insure a uniform product; placing of crushers and screens on one floor for easier operation.

Following the crushing plant, the

DUST COLLECTION IS THOROUGH



DUST-TIGHT HOUSING IS BUILT around each unit in the crushing plant, as has been done with the two Type R reduction crushers in the foreground and the 4-ft. Symons in the rear.



CAUGHT BY CYCLONE, crusher plant dust is pulped in this device. Water jets in the disk at the operator's eye-level swirl dust into vortex; pulp returns to the mill.

flowsheet will include three sections, each rated at 500 tons per day. Two of these will work on straight copper ore; the other will treat either copper-zinc or copper-iron ore.

Grinding circuits in the copper sections include an 8x7-ft. A-C grate-type ball mill in closed circuit with a 72-in. Akins classifier. Feed to all mills is constant-weight, and control of classifier overflow will be automatic. The grind will be held at 1% on 65 mesh.

New Drag Designed

Rougher-flotation concentrate, running about 750 tons per day, will be reground in two tube mills, located on the ball-mill floor and run in closed circuit with a large drag classifier designed by F. T. Davis, plant metallurgist.

This drag is 30 ft. long, 7 ft. 6 in. wide, and 18 in. deep at the lowest point. Its bottom is laid out on a catenary curve. It will use three 18-in. continuous belts with 4-in. flights to rake sand back into the mills. Belt speed will vary according to the load.

Feed to this classifier will average 75% minus-200-mesh, and the overflow will be 98% minus-200-mesh. Grinding to this fineness produces a low cleaner-tailing assay, usually less than 1% copper.

The copper-zinc, or copper-iron, section will use two grate mills and classifiers from the old mill. The grinding circuit here must allow

DESIGN AIDS

PLENTY OF ROOM IN THIS GRINDING BAY. Control of 8x7-ft. A-C ball mill and 6-ft. Akins will be automatic. Cone is a Callow for thickening returned spilled pulp.

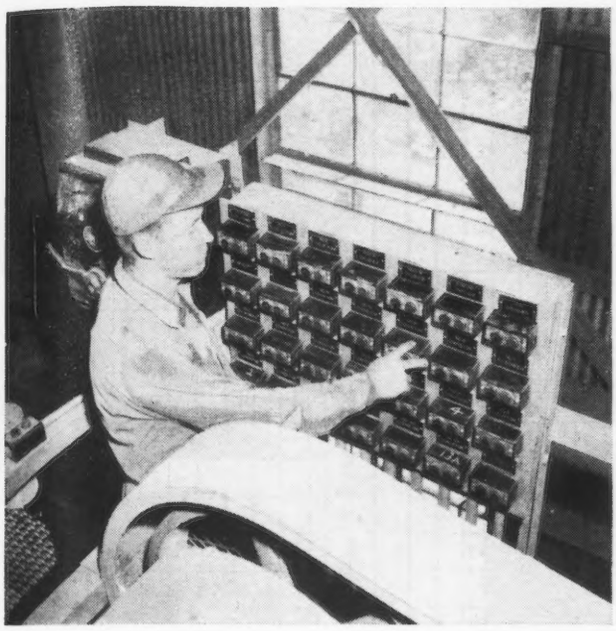
for either single or double-stage grinding. We plan to use double-stage grinding for the copper-zinc ore, and single-stage grinding for the copper-iron ore.

Flotation

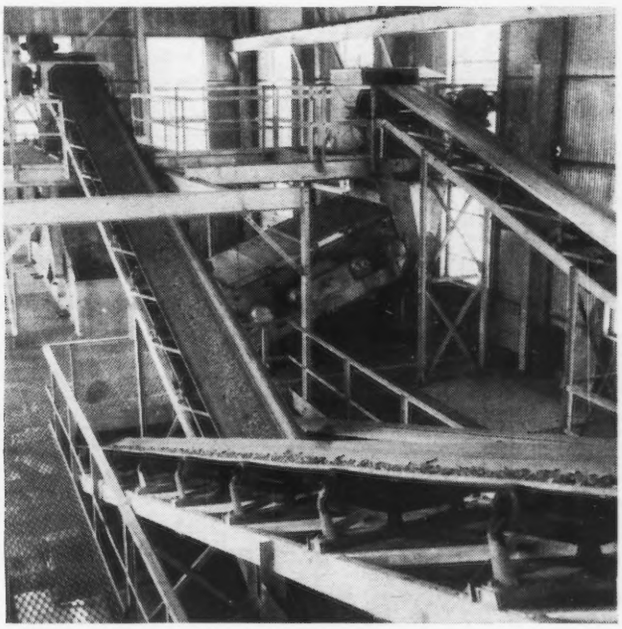
Flotation equipment for each section will include forty-six 36-in. Agitair cells. These will be arranged as follows: Ten cleaners, ten roughers, eight secondary roughers and eighteen scavengers, all placed on one floor. Rougher concentrates are pooled and pumped to the regrind section already mentioned.

Principal ore minerals at Magma include: Bornite, chalcopyrite, enargite, tennantite, chalcocite and native copper. Some orebodies car-

CRUSHER CONTROL IS SIMPLIFIED



CENTRAL STATION FOR CRUSHER CONTROL is high in the plant. Standing here, crusher operator, Ned Cross, can see everything, start or stop all motors.



OPERATOR'S-EYE VIEW OF CRUSHING PLANT shows open design, clean layout. Jaw, cone, and reduction crushers are directly behind and below this point.

MILL OPERATION

FLOTATION SECTION OF THE CONCENTRATOR has forty-six 36-in. Agitair machines all on one floor for easier operation. Lighting is uniform, day and night.

ry sphalerite and traces of galena. Pyrite and hematite are abundant.

To float these minerals, reagent practice will be as follows: American Cyanamid reagent 404, lime and the frother go to the primary ball mills. (Frother is a mixture of methyl-amyl alcohol and pine oil.) Cyanamid 301 will be added at the head of the rougher section, and small amounts of 301 will be added as needed at various points of the rougher and scavenger circuit. The regrind mills will get some lime, but no reagents will be added to the cleaner cells.

One 45-ft. Dorr thickener will take care of the concentrates. No filter is provided, because the thickened concentrate is pumped to the smelter for filtering. One 45-ft. Dorr is used to thicken cleaner tails before returning them to the rougher circuit.

Clean-Up Easy

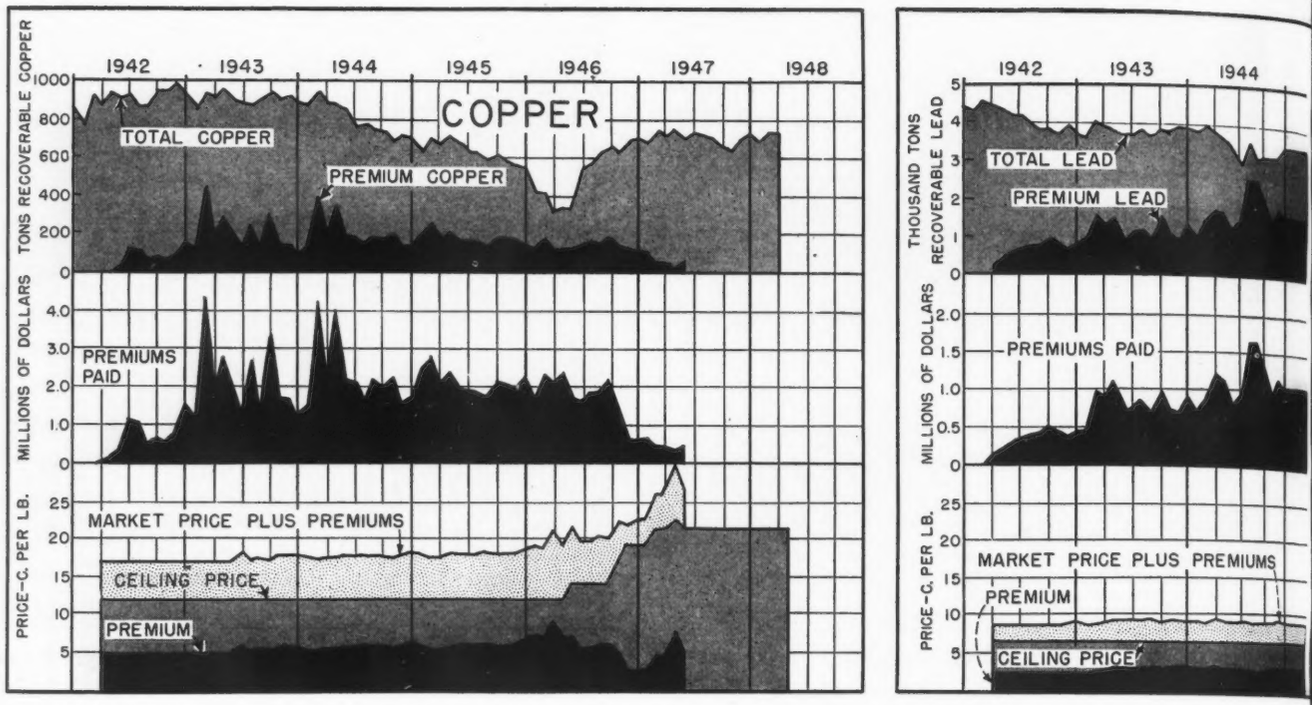
Cleaning up the new mill will be easy. Grating floors are used in the crushing plant and elsewhere, and all concrete floors have enough slope to be washed down easily. On the ball-mill floor, there is a trench, sloping from both ends toward the center, where a settling box is located. Coarse material can be shoveled out of this box into the ball mills.

Overflow from the box runs down a launder into a similar trench on the flotation floor, which in turn discharges into a large sump. A pump, run continuously, empties this sump back into the primary classifiers.

The grinding and flotation building has no windows; lighting is of constant intensity, day and night. This should produce more uniform operating results. Quick assays of concentrates and tailings will be made on each shift.

Tailings go by gravity to the tailings dam, and will be distributed by pipe instead of launders.

The satisfactory results of the change in operation embodied in the new mill are indicated by the comparison of metallurgical results for 1943 with those of 1947 in the accompanying table. These results are expected to improve still further when the new mill is in operation.



RELATIONSHIP of tonnage, cost and price of premium metal to total production. Note slight change in output when premiums ended.

The Premium Price Plan

HENNING E. OLUND*
Mining Engineer
U. S. Bureau of Mines

SAMUEL A. GUSTAVSON
Metal Economics Branch
U. S. Bureau of Mines
Washington, D. C.

ANY ANALYSIS of the effectiveness of the Premium Price Plan for copper, lead and zinc must be based on the solid ground of the cost and production data recorded as the Plan unfolded. In this article, we offer, in somewhat condensed form,[1] performance data covering the life of the Plan (Feb. 1, 1942 to June 30, 1947), and including fairly complete data on the special exploration premiums paid during the Plan's last year.

We make little attempt at evaluation or analysis. We have chosen rather to present the facts as our contribution to the studies of the Plan that we believe should be made as a guide for action in any future emergency.

The Premium Price Plan took shape slowly over a two-year period. It grew out of the Government's efforts, early in the defense program, to maintain and expand production of copper, lead and zinc, and to maintain price stability.

*Formerly Acting Director, Office of Premium Price Plan, Dept. of Commerce.

[1]Details of methods and standards of operation of the P. P. P. will be covered by the U. S. Bureau of Mines, Dept. of Interior, in an Information Circular now in course of preparation.

CHRONOLOGY

September, 1940—Leon Henderson says Government may act if copper, lead and zinc prices continue to rise.

September, 1940—Informal agreements made to hold copper at 12c., zinc at 7.25c., and lead at 5.85c.

August, 1941—Conferences of industry and Government representatives on methods of increasing copper, lead and zinc production.

January, 1942—OPA, OPM and MRC work out details of a premium price plan to increase production of copper, lead and zinc. Ceiling prices set were: copper, 12c., lead, 6.50c., and zinc, 8.25c.

February, 1942—President Roosevelt approves Quota (1941 production) idea and premiums for over-quota production. Quota Committee formed.

May, 1942—Quota Committee formed by equal number of representatives from WPB and OPA. Numerous deadlocks result.

June, 1942—Full-time executive secretary added to Committee. Metal mining office set up in OPA.

January, 1943—Life of Plan extended to July 31, 1945, and "B" and "C" premiums added.

November, 1944—Vice-chairman for metals and minerals of WPB made responsible for Plan.

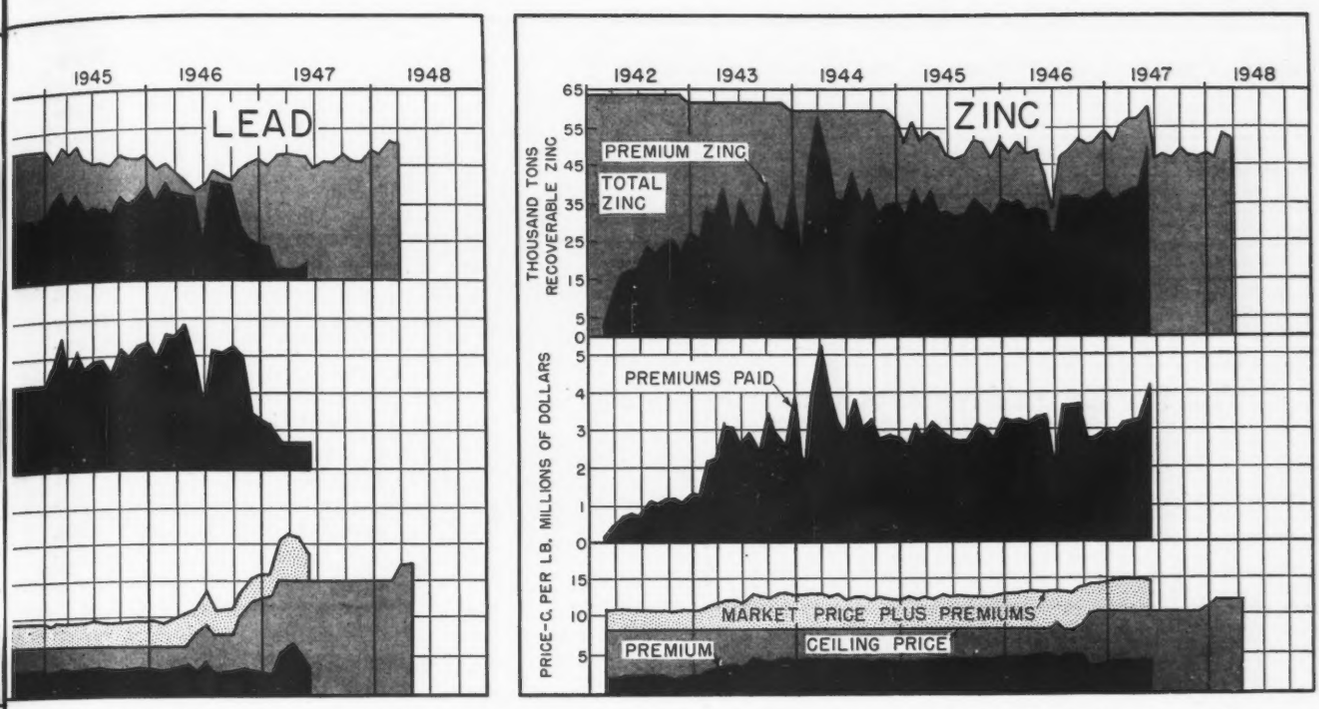
June 3, 1945—Plan extended for one year.

July 25, 1946—Plan extended to June 30, 1947. Exploration premiums added.

January, 1947—New organization of Plan set up by General Fleming.

June 30, 1947—President Truman's veto of Allen Bill ends Premium Price Plan on this date.

. . . February 1, 1942, to July 1, 1947. Without Premiums, July 1, 1947, to Present



HOW EFFECTIVE were the measures taken to increase wartime production of copper, lead and zinc? Studies like this may provide answer.

—Its Cost and Its Results

As shown in the chronology on these pages, Leon Henderson (Price Stabilization Commissioner, Advisory Commissioner to the Council of National Defense) began the move toward the Plan, when he announced on Sept. 27, 1940, that he saw no justification for the unstable price situation in copper, lead and zinc. He said the Government might take action if markets continued to rise.

Thereafter, in one step after another, the system of assistance for non-ferrous metal miners known as the Premium Price Plan was worked out. Under what might be considered the highest expression of its growth, the Plan was operated by a method set up on Nov. 23, 1944 by General Administrative Order No. 2-147, which defined the responsibilities for the administration of the Plan and prescribed the functions of the Premium Price Plan Quota Committee.

Under this order, the vice-chairman for metals and minerals (War Production Board), was made responsible for managing the Plan. Quotas for mines were fixed by agreement between the vice-chairman and the Office of Price Administration. Premiums were, of course, to be paid for over-quota production of copper, lead and zinc.

The Premium Price Plan Quota Committee was designated to be composed of a non-voting chairman appointed by the vice-chairman for metals and minerals (WPB). Also one representative for the Copper Division, WPB; two representatives for the Tin, Lead & Zinc Divisions, WPB; and three representatives from corresponding organizational units for the OPA.

The Quota Committee was authorized to administer the Premium Price Plan. All production quotas were established and assigned subject to the approval of a review board composed of the vice-chairman for Metals and Minerals, a representative of OPA, and a representative of the Metals Reserve Co.

This organization stayed in authority until termination of the WPB, the Civilian Production Administration (successor to WPB), and the OPA, and the transference of the Premium Price Plan to the office of Temporary Controls, Office of War Mobilization and Reconversion, on January 1, 1947.

In addition to the voting members of the Quota Committee, all Committee meetings were attended by the executive secretary of the Quota Committee, the attorney for the Premium Price Plan Division of the OPA, and very often by one or more analytical mining engineers from either the OPA or the WPB Premium Price Plan Divisions.

Representatives of mining companies having special problems to place before the Committee were invited to appear personally to present data and to discuss questions of rules or procedure in assigning quotas.

When General Philip Fleming, Administrator, Office of Temporary Controls, issued an order, effective January 16, 1947, establishing the Office of Premium Price Plan for copper, lead and zinc, five major changes were made in the administrative procedure hitherto followed.

1. The Office of Premium Price Plan became part of the Office of War Mobilization and Reconversion, and all the Plan's personnel, records, files and equipment were consolidated there.

2. The Plan "Office" was modified to include: a director, a Premium Review Board, and the necessary analytical, technical and clerical staff. The Quota Committee, as a deliberative body, was eliminated.

3. The director had responsibility for operation of the plan under policies laid down by the Premium Review Board and approved

THE PREMIUM PRICE PLAN—*(Continued)*

Table I. Assumed Recoveries of Metals for Calculating Premiums

Processing Plant	Rule 13 Metal—Copper	Rule 13 Metal—Lead	Rule 13 Metal—Zinc	Minimum Content—Copper	Minimum Content—Lead	Minimum Content—Zinc
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Copper smelter	97	70	0	0.50	1.50	...
Lead smelter	85	95	0	0.50	1.50	...
Zinc smelter or electrolytic plant	70	60	90	0.50	1.50	1.50
Zinc fuming lead smelter	85	95	81	0.50	0.50	6.00
Custom mills[1]	87	86	77	0.25	0.50	0.50

[1] (a) If ore contained 0.15% or more oxidized metal the percentages shown applied only to the sulphide metal assay.
(b) Special factors were applied to certain custom mills where extractions were below the normal average on which above percentages were based.

Table II. Premiums Paid Per Lb. of Recoverable Metal While Ceiling Prices Still in Effect

Quota	Copper c./lb.	Lead c./lb.	Zinc c./lb.	Zinc Concts. 60% Zinc Short ton	Lead Concts. 80% Lead Short ton
A	5.00	2.75	2.75	$29.70	$41.80
B	...	5.50	2.75	$29.70	$83.60
C	...	...	2.75	$29.70	....
Special	10.00	...	...	....	....

Table III. Calculation of Premiums After Ceiling Prices Were Removed

	Copper c./lb.	Lead c./lb.	Zinc c./lb.	Zinc Concts. 60% Zinc Short ton	Lead Concts. 80% Lead Short ton
Ceiling price (June, 1946)	12.00	6.50	8.25	$ 50.00	$ 76.20
Total maximum premiums	15.00	8.25	8.25	$ 89.10	$125.40
Market price plus premium	27.00	14.75	16.50	$139.10	$201.60
"Steelman Penny"[1]	1.00	1.00	1.00	10.80	15.20
Total maximum assignment	28.00	15.75	17.50	$149.90	$216.80

[1]Under the Steelman Directive No. OES-137, issued on September 13, 1947, Section 2, paragraphs (a), (b) and (c), an additional 1c. per lb. for each metal was provided for any producer whose benefits from the newly established provisions for added development, depreciation and depletion would not be realized solely because his property was already receiving the maximum premiums available.

Table IV. Number of Initial Quotas Issued to Copper, Lead and Zinc Mines

From Feb. 1, 1942, to June 30, 1947

STATE	YEAR ?	1942	1943	1944	1945	First Half 1946	Last Half 1946	1947	TOTAL
Arizona	2	328	211	98	51	32	19	28	769
Alaska	...	2	3	...	...	...	1	...	6
Arkansas	...	11	10	1	0	1	2	0	25
California	...	69	66	23	17	2	9	8	194
Colorado	1	222	124	57	45	16	19	19	503
Idaho	...	144	61	36	29	15	13	4	302
Illinois	...	8	8	3	3	3	6	2	33
Kansas	1	90	21	21	10	6	4	4	157
Kentucky	...	8	4	3	4	...	...	1	20
Massachusetts*	...	1	...	...	...	...	...	...	1
Michigan	...	8	4	1	...	2	1	...	16
Missouri	...	132	56	23	12	14	9	4	250
Montana	1	158	107	56	31	10	23	18	404
Nevada	1	141	92	71	34	13	17	34	403
New Mexico	1	77	42	19	8	6	...	5	158
New York	...	5	...	...	...	...	...	...	5
New Jersey	..	2	...	...	...	...	...	...	2
North Carolina*	...	3	5	1	...	...	...	...	9
Oklahoma	...	178	42	19	8	12	5	6	270
Ohio*	...	...	...	...	...	1	...	...	1
Oregon*	...	5	3	1	2	...	1	1	13
Pennsylvania	...	1	...	...	...	...	...	...	1
South Dakota*	...	1	1	...	...	...	...	...	2
Tennessee	...	11	5	3	...	...	1	...	20
Texas	...	11	8	1	2	...	1	1	24
Utah	2	138	47	47	40	11	37	20	342
Vermont	...	1	1	...	...	...	...	...	2
Virginia*	1	5	...	...	...	...	...	...	6
Washington	...	28	6	8	4	...	1	1	48
Wisconsin	...	82	41	23	8	10	10	10	184
Wyoming*	...	2	...	...	2	...	...	...	4
Total—31 States	10	1,872	968	515	310	154	179	166	4,174

617 mines were receiving premiums on June 30, 1947.
*No mines in these States were receiving premiums on June 30, 1947.

by the Commissioner of the OWMR. The director issued all quotas in his own name.

4. The Premium Review Board included three members; one appointed by the board of directors of the RFC, one, by the Commissioner of the OPA, and one, by the Commissioner of the CPA.

5. The director's decisions could be appealed, first to the Premium Review Board, then to the Commissioner of the OWMR, whose decision was final.

Under this new arrangement, the Office of Premium Price Plan was divided into six branches: exploration, Tri-State mines, East-West lead-zinc mines, copper mines, statistics section and secretary's office. The staff of about fifty included mining engineers, geologists, statisticians and clerical employees.

The Premium Price Plan ended on June 30, 1947, with President Truman's veto of the Allen Bill, which had been passed by Congress on July 26, 1947.

Establishing Quotas

During the last year of the Plan, quotas were fixed by the methods outlined in the following discussion.

The word, quota, in this report refers to a basic quantity of copper, lead or zinc that each operator was regarded as being able to produce without benefit of premium. All metal produced over that figure won a premium per lb. of metal for the operator; the amount depending on market prices, operating costs and other variables. For established mines, the basic quota was the mine's output during 1941. For new mines, quotas were fixed by estimate.

Initial quotas, or premium assignments, were issued only on an operator's application. Likewise, quotas were cut (meaning an increase in premiums) only on an operator's application. In both cases, the assignment took effect on the first day of the month in which the application was made.

Quotas could be increased (meaning a cut in premiums) by the Plan staff, if a mine's earnings rose excessively over an adequate margin.

When an application came in from a new mine, the staff mailed out the appropriate information forms and an affidavit form. When these were returned properly filled out, an initial quota was assigned at once, pending calculation of the proper premium assignment.

An application for revision of quotas required a forecast of the

production-cost-revenue status of the mine during the next three months. Also, detailed information was called for on the reasons why a quota revision should be made.

No retroactive quota revision was permitted for the purpose of making up for margin deficiencies or for amortization deficiencies in previous quota periods.

Likewise, excess-over-margin earnings in previous quota periods were not considered, or deducted, in calculating a revised quota. However, provision was made in calculating margins for a revised quota for additional premium to liquidate the unamortized balance of the originally approved capital investment.

Calculating Premiums[1]

All applications for new or revised premium assignments were handed to an analyst who studied the data presented, called for more information if need be, and compared the application's forecast with previous production records if these were available. If the analyst found that some of the estimated expenses were too high, he modified them according to his best judgment. If some of them seemed too low, or if some item were missing, the analyst corrected for them with a "contingency" allowance.

An approved production-cost-revenue schedule was thus built up. It carried the following items:

1. Tons ore milled or shipped monthly.
2. Assays: gold, silver, copper, lead, zinc, sometimes cadmium.
3. Copper, lead, zinc produced, lb. per month.
4. Operating costs, per ton of ore.
5. Amortization cost, per ton.
6. "Normal" development cost, per ton.
7. Royalty, per ton.
8. Depreciation, per ton. (Complex ores, 10c. Simple lead or zinc ores, 7c. Tri-State ores, 5c. Copper ores, 0.1c. per lb.)
9. Depletion, per ton. (Allow 25% of net smelter payment for all metals paid for in addition to copper, lead and zinc.)

The recovery factors applied to copper, lead and zinc ores in calculating premiums appear in Table I. The amounts of the premiums available, in cents per lb. of recoverable metal, appear in Table II. Tri-State premiums were calculated in dol-

[1]See footnote on first page.

Table V. Summary of Premiums paid from Feb. 1, 1942, to June 30, 1947

(Classified according to size of premiums)

Size of Premium	East-West Mines: Number of Mines	East-West Mines: Total Premiums Received	Tri-State Mines: Number of Mines	Tri-State Mines: Total Premiums Received	Total U. S. Mines: Number of Mines	Total U. S. Mines: Total Premiums Received
$0 to $100	632	$ 26,806	76	$ 3,476	708	$ 30,282
$100 to $500	642	163,508	122	35,386	764	198,894
$500 to $1,000	249	178,734	50	36,926	299	215,660
$1,000 to $10,000	649	2,487,039	149	552,329	798	3,039,368
$10,000 to $100,000	438	16,012,627	114	4,318,467	552	20,331,094
$100,000 to $500,000	193	44,721,962	114	27,747,555	307	72,469,517
$500,000 to $1,000,000	47	35,597,407	42	31,448,765	89	67,046,172
Over $1,000,000	58	163,317,932	16	24,459,220	74	187,777,152
Totals	2,908	$262,506,015	683	$88,602,124	3,591*	$351,108,139**

*4,174 Initial Quota assignments were made. 583 of these did not report any production and did not receive any premiums.

**Note: Premium payments shown include Exploration Premiums paid from 7/1/46 to 6/30/47.

Table VI. Distribution of Premium Funds for Whole United States

Feb. 1, 1942, to June 30, 1947

Classification as to size	Total U. S. Mines: Number of Mines	Total U. S. Mines: Percent of Total Mines	Premiums Paid: Amount of Premiums	Premiums Paid: Average Amount per month	Premiums Paid: Percent of Total Premiums	Average Premium per Mine
$0 to $10,000	2 569	72	$ 3,484.204	$ 53,603	1	$ 1,356
$10,000 to $100,000	552	15	20 331,094	312,786	6	36 832
$100,000 to $1,000,000	396	11	139,515 689	2,146,395	40	352.312
Over $1,000,000	74	2	187,777,152	2.888,879	53	2,537,529
Totals and Average	3,591	100	$351,108,139	$5,401,663	100	$ 97,774

Note: 617 Mines were receiving premiums as of June 30, 1947 (end of Premium Price Plan). (Figures shown are derived from RFC report as of December 31, 1947).

Table VII. Total Cost of Premium Price Plan

Feb. 1, 1942, to April 1, 1948

Production premiums		$345,153,970
Limited exploration premiums		489,303
Project exploration premiums		5,646,757
Total premiums paid out by RFC		$351,290,030
Refunds for uncompleted exploration work[1]		535,960
Net amount of all premiums		$350,754,070
Administrative costs (office and field costs)[2]		
January 1, 1942, to January 31, 1947	$1,740,000	
February 1, 1947, to August 31, 1947	169,866	
September 1, 1947, to May 31, 1948[3]	19,078	
Estimated expense to RFC, Jan. 1, 1942, to May 31, 1948[4]	265,000	2,193,944
Total Cost of Premium Price Plan		$352,948,014

[1]Additional refunds from accounts not yet closed may exceed $30,000.

[2]Exact costs not available from Jan. 1, 1942, to Jan. 31, 1947, because administration was divided between several agencies now out of existence. From various sources, enough information indicates above approximation as probable cost.

[3]Liquidation period.

[4]Estimate includes cost of field examinations and audits of mines having exploration premiums, and administration and accounting costs attributable to Premium Price Plan during its life.

Table VIII. Monthly-and Yearly Costs, Premium Price Plan

Item	Period Involved Months	Total Expenditures	Cost Per Month	Cost Per Year
Production premiums	65	$345,153,970	$5,310,061	$63,720,732
Exploration premiums	8[1]	6,136,060	767,008	9,204,096
Administration costs	68[2]	2,113,866	31,086	373,032

Administrative Cost = 0.59% of total premiums paid.

[1]Average period during which exploration work was performed.

[2]Period used is from January 1, 1942, to August 31, 1947, at which time the staff was reduced to a very small liquidation force.

Table IX. Cost of Plan in Terms of Metal Produced by It

	Metal, Lbs.	Premiums Paid—Total Amount	Premiums Paid—Cents Per Lb.	Administration Costs—Total Amount	Administration Costs—Cents Per Lb.	Total Costs—Total Amount	Total Costs—Cents Per Lb.
Copper[1]	1,958,051,997	$109,506,824	5.593	$ 684,958	0.035	$110,191,782	5.628
Lead[2]	1,923,087,996	65,568,212	3.410	410,125	0.021	65,978,337	3.431
Zinc[3]	4,319,696,620	175,679,034	4.067	1,098,861	0.025	176,777,895	4.092
Totals	8,200,836,613	$350,754,070	4.277	$2,193,944	0.027	$352,948,014	4.304

[1]19.59% of total produced in U. S. over same period.
[2]42.15% of total produced in U. S. over same period.
[3]57.61% of total produced in U. S. over same period.

Table X. Summary of Distribution of Exploration Assignments

Classification and Number of Operators	Number of Mines Represented	Exploration Total Received	Premiums % of Grand Total	Average Per Company	Premium Per Mine
Large operators (19)	32	$3,594,913	59	$189,206	$112,341
Medium operators (21)	23	1,446,300	23	68,871	62,883
Small operators (25)	27	605,544	10	24,222	22,428
Very small operators (381)	381	489,303	8	1,284	1,284
Totals and averages, 446 operations	463*	$6,136,060	100	$ 13,758	$ 13,253

*This is 73% of total mines (637) receiving premiums during the year ending June 30, 1947.

Table XI. Project Exploration Data Assignments by Regions

Region	Number of Mines	Premium Funds—Amount Requested	Premium Funds—Amount Approved	Premium Funds—Net Amount Received After Refunds	Percentage of Approved Work Completed	Actual Expenditures for Exploration Work Completed
Western states	63	$ 8,949,839	$4,695,604	$4,234,485	79	$5,021,211
Central states	17	1,877,856	841,538	772,022	94	833,715
Eastern states	2	171,750	109,615	109,615	100	142,830
Total U. S.	82	$10,999,445	$5,646,757	$5,116,122*	82	$5,997,756

*Refunds received = $530,635.
Note: Several companies classified as large spent their own funds in addition to premium funds on exploration work performed.

Table XII. Project Exploration: Summary of Costs of Exploration Work Approved and Exploration Work Completed

Exploration Work	Drifting and Crosscutting—Linear Feet	Drifting and Crosscutting—Cost per Foot	Raising—Linear Feet	Raising—Cost per Foot	Sinking[1]—Linear Feet	Sinking[1]—Cost per Foot	Drilling—Linear Feet	Drilling—Cost per Foot
WESTERN MINES								
Approved	139,655	$24.20	10,045	$20.91	5,183	$106.98	179,470	$3.55
Completed	112,319	29.81	4,287	30.32	4,324	149.83	140,603	4.00
CENTRAL MINES								
Approved	8,560	18.91	850	44.53	311	52.78	289,351	2.01
Completed	8,475	25.57	481	41.79	214	61.50	276,025	1.91
EASTERN MINES								
Approved	2,150	18.07	None	....	1,300	37.60	6,600	3.32
Completed	1,855	25.54	None	....	1,302	54.51	8,186	2.99
TOTAL U. S. MINES								
Approved	150,365	23.81	10,895	22.75	6,794	91.22	475,421	2.61
Completed	122,649	29.45	4,768	31.48	5,840	125.30	424,814	2.62

[1]Includes shaft pockets, stations, timbering, etc. Much of the work consisted of small, shallow winzes.
Note: The above costs do not include allowances for amortization of equipment or rehabilitation of old workings, which amounted to a total of $388,232, or 6.47% of the total exploration expenditures.

lars per ton of lead or zinc concentrates.

With removal of ceilings, premium assignment had to be revised so that RFC agents could automatically determine premium payments according to market prices prevailing when the ore was delivered to the treatment plant.

The method devised was to add the ceiling price per lb. of metal to the maximum premium paid for that metal. The so-called "Steelman penny" was then added, (See footnote, Table III), and the result was the total maximum payment that could be given for each metal.

On each lot of over-quota ore, the current market price was subtracted from this "maximum assignment" for each metal, and the difference was paid as the premium. This method took effect on November 1, 1946, and all assignments were reissued in this form. The quantities of payments appear in Table III.

Normal development costs were assumed to be the cost of replacing one ton of current ore production. This item was determined usually from the average cost of development at the mine from 1936 to the date of premium assignment. Any normal development funds unspent, because of inability to get labor, equipment, or for other reasons, could be carried in a deferred-development account for future use.

Amortization on approved capital investments made solely for war production after January 1, 1942, could be made at a rate calculated to liquidate the investment by the end of the Premium Price Plan. After April 14, 1945, such investments had to be approved for amortization by the lead-zinc branch of the WPB.

Royalties paid by operators for working mines or dumps as leasers were regulated under the Plan. In general, the maximum royalty permissible was that in effect on December 31, 1942. Royalties set up after that date had to be approved by the OPA Administrator, and in no case could exceed the "A" premiums on copper, lead and zinc. After November 10, 1946, a new directive limited royalty payments to those in effect on that date, or to the general level of royalties in effect in the same general area on that date.

"Other costs" was an item usually applied to small mines with no previous production experience or ore reserves of consequence. These were unable to submit information from which an accurate quota assignment could be calculated. When

it was clear that some cost items had been overlooked by the operator, or were too low, a "contingency factor" was used to supply enough premium to cover costs.

Margin was calculated by a formula developed to compensate operators for taxes, depreciation on mine and mill plant, depletion, interest on capital investment, and so on. This margin was added to the more direct operating costs. The margin formula was based upon information derived from the pre-1942 financial records of a great many representative mines.

This formula was an incentive to efficient operation because the higher the operating costs, or the lower the grade of ore, the smaller the calculated margin became.

The formula applied to lead and zinc mines except the Tri-State mines, where uniform operating conditions permitted use of a table of standard margins that varied according to recoverable grade of zinc sulphide equivalent metal. For copper mines, special margin curves were developed, one for major mines and one for minor mines. (Complete details on margin calculation appear in the author's Information Circular already cited.)

Final calculation of premium needed was made as follows:

Operating costs	$ per ton of ore
Amortization cost	...
Normal development cost	...
Royalty	...
Other costs	...
Margin (calculated)	...
Total costs	...
Less net smelter returns	...
Premium needed	...

Premiums per lb. of copper, lead or zinc required to satisfy the total monthly premium needed were determined by consideration of the metal predominating in the ore and the market prices of the metals.

For instance, if the market price for lead was higher than the maximum "market-price-plus-premium" (15.75c.) available, the copper or zinc metal would have to satisfy the total premium needed. It was possible that market prices on all three metals could be so high, and yet the needed premium be so high, that the maximum market-price-plus-premium assignment for each metal would not satisfy the needed premium.

When a premium recommendation was completed, it was checked for errors, then submitted to the director, who, with the assistance

Table XIII. Project Explorations: Summary of Miscellaneous Data Pertaining to Exploration

Item	Western	Central	Eastern	Total U. S.
Number of mines that completed projects	20	13	2	35
Number of mines that did not complete projects	43	4	0	47
Total mines having Exploration Projects	63	17	2	82
Average no. of months during which premiums were earned	7.6825	6.4118	5.0000	7.3537
Average no. of months during which Exploration work was done	10.1587	7.4118	8.5000	9.5488
Average Exploration Progress				
Per mine—per month, linear feet				
Drifting and crosscutting	175	67	109	157
Raising	7	4	...	6
Sinking	7	2	77	7
Drilling	220	2,191	482	543
Total Expenditures, including Equipment and Rehabilitation	$ 7,846	$ 6,617	$ 8,402	$ 7,660
Per mine—per year, linear feet				
Drifting and crosscutting	2,100	804	1,308	1,884
Raising	84	48	...	72
Sinking	84	24	924	84
Drilling	2,640	26,292	5,784	6,516
Total Expenditures, including Equipment and Rehabilitation	$94,152	$79,404	$100,824	$91,920

Table XIV. "Limited" Exploration Premium Data

Item	Western States (10)	Central States (8)	Eastern States (0)	Total U. S. (18)
Number of Mines receiving premiums	326	55	None	381
Total Premiums received	$346,179	$143,124	None	$489,303
Total Rule 13 metals, Pounds	34,617,900	14,312,400	None	48,930,300
Average total Premium per mine	$1,062	$2,602	None	$1,284
Average total Rule 13 metals per mine, Pounds	106,190	260,225	None	128,426
Average period of Premium Payments, Months.	6.4448	6.7636	None	6.4908
Average monthly production of Metals, per mine	8.2385 tons	19.2370 tons	None	9.8930 tons
Average monthly premium, per mine	$165	$385	None	$198
Average yearly production of Metals, per mine	99 tons	231 tons	None	119 tons
Average yearly premium, per mine	$1,980	$4,620	None	$2,376

Table XV. Summary of Premiums Paid and Exploration Costs "Limited" and "Project" Exploration Combined

Item	Western States	Central States	Eastern States	Total U. S.
Total number of mines receiving premiums	389	72	2	463
Total Premiums paid	$5,041,783	$984,662	$109,615	$6,136,000
Total Combined Rule 13 metals produced, Lbs.	293,529,190	73,782,754	3,893,958	371,205,902
Average premium paid, per lb., combined metals	1.72c	1.33c	2.82c	1.65c
Total Actual Cost of Exploration Work performed	$5,367,390	$976,839	$142,830	$6,487,059
Average period during which exploration was performed	7.0463 mos.	6.9167 mos.	8.5000 mos.	7.0530 mos.
Average Exploration Expenditures, per month	$761,732	$141,229	$16,804	$919,765
Total Exploration Expenditures, per year	$9,140,784	$1,694,748	$171,396	$11,006,928
Average Exploration cost, *per mine—per year*				
Very small mines, "Limited Exploration"	$1,980	$4,620	None	$2,376
Large mines, "Project Exploration"	$94,152	$79,404	$100,824	$91,920

637 mines, located in 24 states, received *production* premiums during the period in which exploration premiums were assigned. 463 mines, located in 20 states, received *"Limited" and "Project" exploration* premiums.

Therefore 73% of the mines having *production* premiums also had *exploration* premiums.

of his chief aides, made any changes deemed advisable. The recommendation then went to the board of three reviewing officers for final approval, revision, or rejection. Data on the Plan's operation appear in Tables IV to IX.

Results of Plan

It is seen from these tables that 13% of the total mines receiving premiums were paid 93% of the total premiums, and 7% of the total premiums paid out was spread over 87% of the total number of mines. Over 3,000 of the quotas assigned went to small leasers and prospectors, who operated anywhere from one month to a year and whose production was small and erratic.

On the other hand, very few of the mines receiving premiums over $100,000 could be classed as very large mines. Many of them were old properties, idle for many years, but revived under the encouragement of premium subsidies.

Stringent manpower, equipment, and supply restrictions during the whole life of the Plan prevented normal new development and exploration ventures. The whole purpose of the Plan was to obtain maximum production at low cost from submarginal ores known to exist in currently operating mines, or in dormant mines, or in mine or tailing dumps. From this standpoint, the Plan was most successful.

The total market-price-plus-premium cost of copper, lead and zinc produced by premium mines during the life of the Plan certainly did not exceed the following limits, in cents per lb.:

	Copper	Lead	Zinc
Market ceiling	13.23	7.54	8.56
Premium costs	5.50	3.25	4.00
Market-plus-premium	18.73	10.79	12.56
Present market prices	23.50	21.50	17.50

The total over-all metal production of all U.S. mines during the life of the Plan was: copper, 9,994,000,000 lb.; lead, 4,562,000,000 lb.; zinc, 7,498,000,000 lb. Based on these figures, the average costs of these metals from Feb. 1, 1942 to June 30, 1947 were, in cents per lb.:

	Copper	Lead	Zinc
Market ceiling	13.23	7.54	8.56
Premiums	1.10	1.45	2.36
Total	14.33	8.99	10.92
Present market prices	23.50	21.50	17.50

Exploration Premiums

The legislation extending the Plan from July 1, 1946 to June 30, 1947 provided for premiums, exploration work and for additional allowances for depreciation of mine plant and depletion of metals paid for by the smelters not already provided for under the Plan's margin formula. The exploration premiums were paid on production of copper, lead and zinc ores from producing mines and on projects from which there was reasonable hope for production by Dec. 31, 1947.

Two classes of exploration premiums were offered: "Limited" premiums went to mines producing less than 600 tons of combined metals per year; "project" premiums went to mines producing more than 600 tons of metals per year.

Limited exploration premiums paid a flat one cent per lb. of metal, to be spent within two months after receipt, and not to exceed $1,000 per month. No monthly reports were required, but an accounting had to be submitted to the RFC after the funds were spent.

Project exploration premiums were not available to mines earning adequate margins without other premiums. They were assigned only for specific projects fully justified by detailed data. One mine could, however, apply for several separate projects not related to each other.

All exploration premium funds not used by Dec. 31, 1947 were to be refunded.

The difference between exploration and normal development work (provided for in production premiums) remained vague despite a general statement issued to define it. In many instances judgment had to be exercised in deciding what to approve as exploration work.

There was no limit to the total amount of exploration work that could be approved for any one applicant, except that the work had to be completed by Dec. 31, 1947. Likewise, there was no limit in cents per lb. of metal produced to provide the premium. (Details of the methods used in assigning exploration premiums will appear in the author's Information Circular, already cited.)

The premium assignment was expressed in cents per lb. of recoverable metal produced from the effective date of the assignment to June 30, 1947, the total not to exceed the approved total premium. Therefore, the cents-per-lb. assigned depended on the total premium divided by the total pounds of recoverable metal produced. Practically this varied from 0.25c. to 12.00c. per lb.

Each project was approved in whole or in part, or denied, on recommendation of the analyst, and approval of his findings by the director and the reviewing officers. The total amount of the premium depended on how much of the work applied for was finally approved. Assignments varied between $10,000 and $400,000. About 40% of the premiums applied for were denied.

Data concerning the exploration premium phase of the Plan are given in accompanying tables.

Only 43% of the total mines receiving exploration assignments completed their projects. The other 57% of the total mines completed about 70% of the work approved.

The ore developed, as shown in the tabulations, is only that actually reported by the operator in his final report. A few operators reported rather fantastic estimates of probable ore, which did not seem justified by the data submitted. These estimates were not credited as "ore developed."

On the other hand, reliable information indicates that some of the larger operators found evidence of large ore reserves but, for various reasons, did not report in writing any definite estimate of the size of these reserves. Some Western states tax ore reserves, which may be one reason for this silence; and many companies regard only "blocked" ore of definitely commercial value, at current market prices, as ore reserves, which may be another reason.

The average grade of ore mined to produce exploration premium funds was almost identical to that of the ore developed. Both were sub-marginal in grade, and could not be mined profitably without premiums.

A few minor changes in administering the exploration phase of the Plan are indicated. A clear-cut line should be drawn between exploration and development work, and a definite schedule of amortization rates should be set up for different types of equipment as well as a schedule of depreciation allowances on equipment already in use but transferred to exploration.

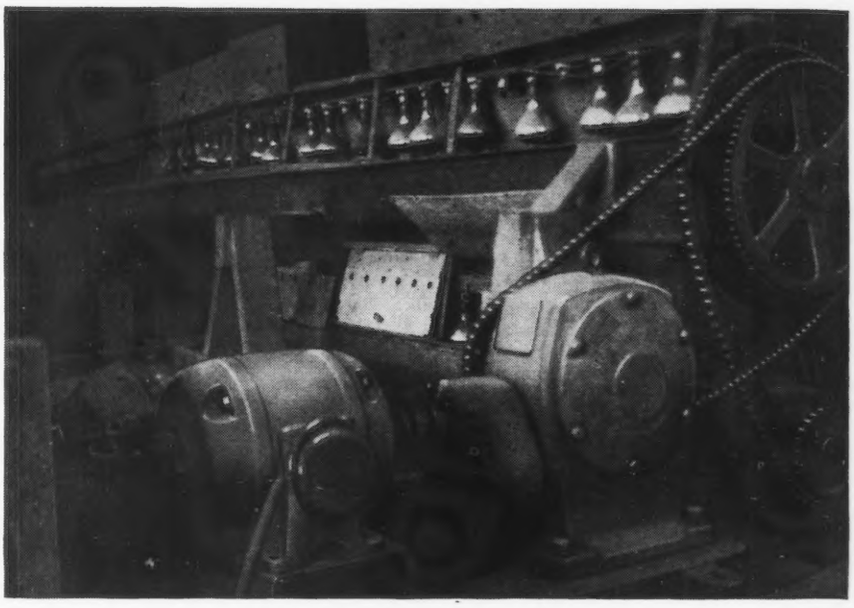
Definite safeguards are needed to prevent duplication of costs in production and exploration accounting. Reports on exploration work should be simplified, but they should be accompanied by current production operating reports. Definite limits on sizes of openings for exploration should be decided upon.

Unit costs of this work, as shown in these records, when adjusted to current costs of labor and supplies, afford an accurate basis for any future exploration plan.

North Carolina an Important Tungsten Producer

M. H. KLINE
and
F. K. McINTOSH

Mining Engineers
Raleigh Branch, Mining Division
U. S. Bureau of Mines



INFRARED LAMPS suspended above the screw conveyor dry the concentrate after it has been filtered.

LAST YEAR the Tungsten Mining Corp., in North Carolina, became the second largest producer of tungsten in the United States. The fact that its deposits have been developed since 1943, to the extent that they are now among the leading producers in the country, indicates the importance of the discovery of this district, known also as the Hamme district. It provides a gratifying example of the results to be attained by friendly cooperation between government agencies and private enterprise under favorable conditions.

Initial phases of the district's development were described in the August, 1944, issue of *E&MJ*. Since then, additional exploration and development have appreciably extended the ore reserves and encouraged plant improvements. Mining has been done continuously, with periodic increases in the production rate.

Production of tungsten ore at present is at the rate of 250 tons per day. This may soon be increased to 275 tons. The mine is operated two shifts and the mill three daily, six days a week. About 110 men are employed underground, and 100 more on the surface. At present, the larger part of the output comes from the Walker 2 and 3, Sneed 2, Walker 6 and Morton 1 veins. Smaller amounts are mined from Walker 9.

Development and mining are being extended on the more recently developed Sneed 1, Walker 6, Morton 1, and Sneed 2 veins. Four shafts have been sunk and are hoisting ore. A fifth is under repair.

The deepest shaft, Walker 4 on Walker 3 vein, has been sunk to the 350-ft. level, and a 150-ft. winze put down below the 300-ft. level. Ore has been proven on this vein to a depth of 450 ft. and laterally for 380 ft. at the 400-ft. level. Underground workings total more than 11,000 ft. in extent.

Mineralized portions of the vein vary from 2 to 42 ft. in width, averaging about 20 ft. The biggest lens was 380 ft. long and over 400 ft. deep. Average grade shipped to the mill assays 0.9 percent WO_3. About 10% of the WO_3 values are in scheelite and the rest in huebnerite. Smaller amounts of other minerals occur in the ore, but at present are not of commercial importance. To date more than 100,000 units of WO_3 have been produced.

At present capacity, the company has ample reserves for five years. An estimated 440,000 tons of ore is blocked out or indicated.

A small gravity concentrator, erected by Hamme Bros., was abandoned in 1946 when the new 200-ton modern mill was put into operation. It is now being enlarged to 300 tons per day capacity. Equipped with the latest machinery, it has improved the recovery and the grade of concentrates produced. Some of the concentrates are now shipped direct to the General Electric plants at Cleveland, without need for further processing in outside custom plants.

While much of the early development and many innovations in the milling processes were made when the properties were operated by Haile Mines, Inc., the most recent improvements in mining and milling have been undertaken since 1945 after General Electric purchased its interest in the company.

Various new types of equipment have been investigated. As a result of rather extensive tests, the company is converting to the use of tungsten carbide in all rock-drill bits.

The flowsheet used in concentration is shown. The ore from the mine is first screened at 1 in. and the oversize reduced in a 9x36-in. Telsmith jaw crusher. The combined products are then screened at ½-in. on a 4x6-ft. Niagara screen. The undersize goes to the concentrator bins. Oversize is crushed in a set of 42x16-in. Allis-Chalmers rolls in closed circuit with the screen.

In the mill, a novel infrared light dryer has also been installed and is reported to be running satisfactorily.

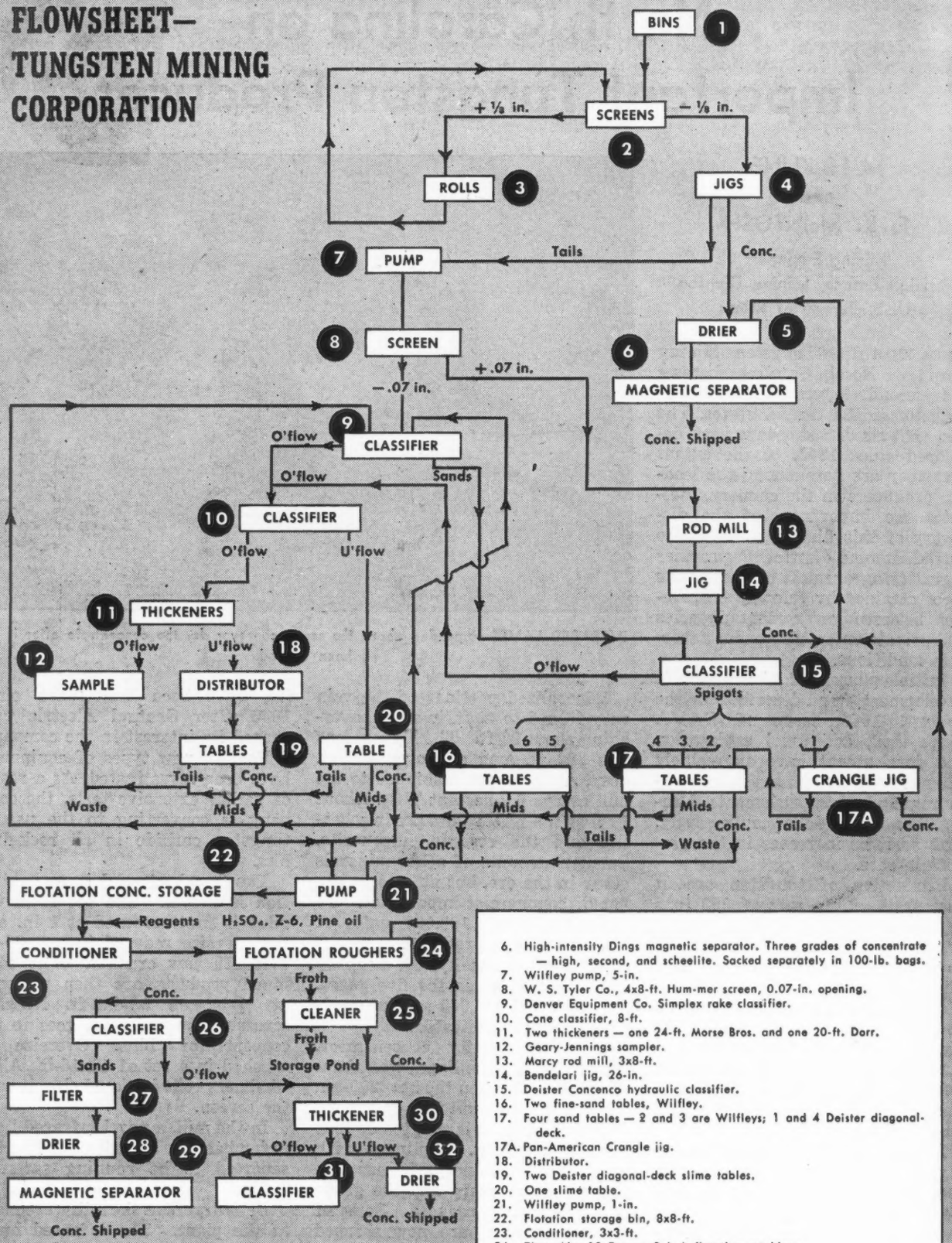
Both dryers at the mill were made at the plant. The infrared bulbs now in use are of General Electric make. Others have been tried but these have been more satisfactory.

The dryer used on the jig concentrates consists of a U-shaped steel launder 10 ft. long. The concentrate is moved by a 5-in. screw conveyor under 18 375-w. infrared lamps.

The float-concentrate dryer laun-

Use of infrared drying of the concentrates is a feature

FLOWSHEET— TUNGSTEN MINING CORPORATION



LEGEND

1. Two 200-ton bins; 24-in. Denver feeders to conveyor belt.
2. W. S. Tyler Co., 4x8-ft. Hum-mer screen, ⅛ in. opening.
3. Allis-Chalmers rolls, 30x14-in. discharge to elevator.
4. Two 36-in. Bendelari jigs, cup and hutch products combined.
5. Plant-made infra-red drier. See text.
6. High-intensity Dings magnetic separator. Three grades of concentrate — high, second, and scheelite. Sacked separately in 100-lb. bags.
7. Wilfley pump, 5-in.
8. W. S. Tyler Co., 4x8-ft. Hum-mer screen, 0.07-in. opening.
9. Denver Equipment Co. Simplex rake classifier.
10. Cone classifier, 8-ft.
11. Two thickeners — one 24-ft. Morse Bros. and one 20-ft. Dorr.
12. Geary-Jennings sampler.
13. Marcy rod mill, 3x8-ft.
14. Bendelari jig, 26-in.
15. Deister Concenco hydraulic classifier.
16. Two fine-sand tables, Wilfley.
17. Four sand tables — 2 and 3 are Wilfleys; 1 and 4 Deister diagonal-deck.

17A. Pan-American Crangle jig.

18. Distributor.
19. Two Deister diagonal-deck slime tables.
20. One slime table.
21. Wilfley pump, 1-in.
22. Flotation storage bin, 8x8-ft.
23. Conditioner, 3x3-ft.
24. Three No. 18 Denver Sub-A flotation machines.
25. Cleaner.
26. Esperanza classifier, 10-in., plant-made.
27. Dorrco filter, 6x3-ft.
28. Plant-made infra-red drier. See text.
29. High-intensity Dings magnetic separator. Three grades of concentrate — high, second, and scheelite. Sacked separately in 100-lb. bags.
30. Thickener, 9x6-ft.
31. Plant-made cone classifier, 8-ft.
32. Batch drier.

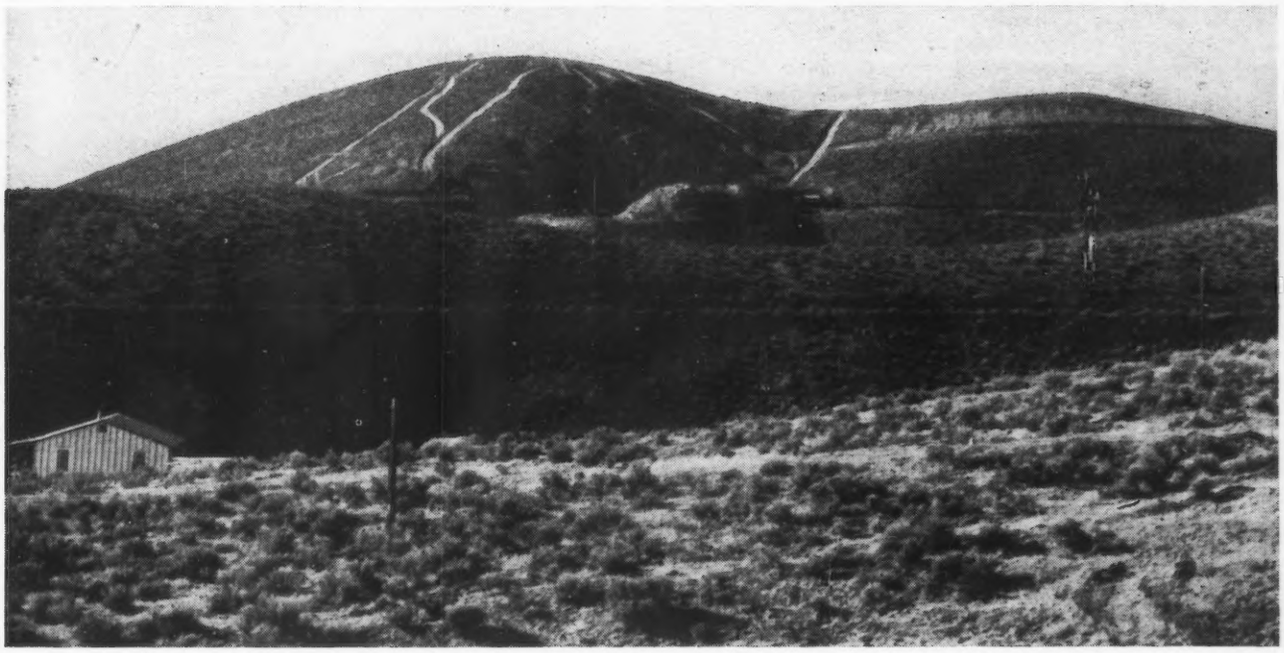
der is of the same type. It is 20 ft. long and wide enough to permit the use of two parallel screw conveyors under 66 375-w. infrared lamps. One of the screws has a right-hand and the other a left-hand turn.

During the past year the company also built a new office, a chemical laboratory, and accommodations for 60 families.

Exploratory work by the company and the Bureau of Mines has increased the known reserves and defined the extent of mineralization in the district. The company has completed over 27,000 ft. of core drilling on its property. The Bureau has done 8,442 ft. of drilling and 12,840 ft. of trenching on the same property and on the one adjoining. During 1947 it also supervised the digging of 30 trenches, the work of sampling, and 7,213 ft. of core drilling. The last was done for the Army Engineers to ascertain what the effect will be of flooding certain areas in the district when Buggs Island Dam is built.

The Geological Survey had cooperated during the development period. It has been of great assistance in interpreting geologic data, logging drill cores, and mapping the district. In 1947 it participated in the cooperative project with the Army Engineers and also made a geophysical survey of part of the district. Those interested in the geological details and drilling results obtained are referred to the reports of the Survey and the Bureau covering work done up to 1947.

Acknowledgement is made to F. H. Bishop, general manager, G. M. Brown, general superintendent, J. T. Hanvey, mill superintendent, and A. O. Wilson, mine superintendent, for helpful cooperation.



TRENCHES DUG by bulldozer cut across the formations on the mountainside.

Bulldozer Cuts Exploration Cost

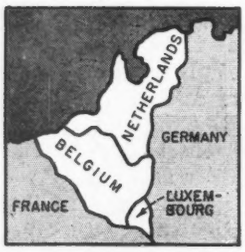
ATTRACTING THE EYE of the traveler between Imlay and Winnemucca, Nev., on U. S. Highway 40 is a series of mysterious lines or narrow gashes that extend for great length down the eastern slope of the Eugene Mountains. More specifically, this is in the area where the tungsten properties of Nevada-Massachusetts Co. are situated. The mines are about 12 miles from the highway. As one approaches them, he finds the lines are shallow trenches which have been made by a bulldozer. According to Eldridge Nash, mine superintendent, their purpose is to do a better job of exploration at lower cost.

The tabular scheelite orebodies under exploitation occur in silicified limestone beds, with hornfels on each wall, traversed at various points by granite, aplite and hornblende dikes. The general strike of the system is N. 15 deg. to 20 deg. E. Save for those in the hanging wall of the Stank and Yellow scheelite mines, which dip east, all beds dip west at about 70 deg.

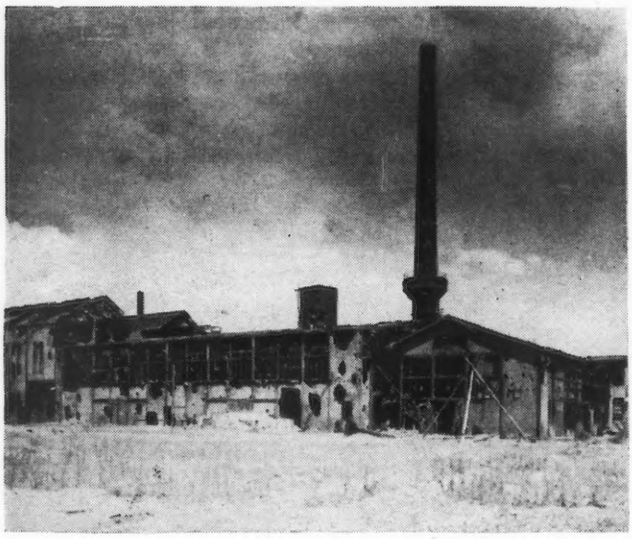
Prior to adopting the practice of trenching with a bulldozer, surface prospecting and search for hidden outcrops were done by hand trenching. This was time-consuming and costly, especially when done some distance from the mine. The current procedure is to cut across the formations, selected previously on the local geologic map, by downhill bulldozer trenches. The openings thus made are examined with special ultraviolet lamps at night. Usually, the outcrops are covered with 3 to 5 ft. of overburden, though in cases the bulldozer has had to dig as deep as 15 ft. The bulldozers are in general able to move over the hillsides without previous road preparation. Whenever ore is encountered and more detailed exploration is indicated a road is built. Equipment available for this work includes an Allis-Chalmers HD14 tractor with dozer blade, a Caterpillar D6 bulldozer, and a Caterpillar D6 loader.

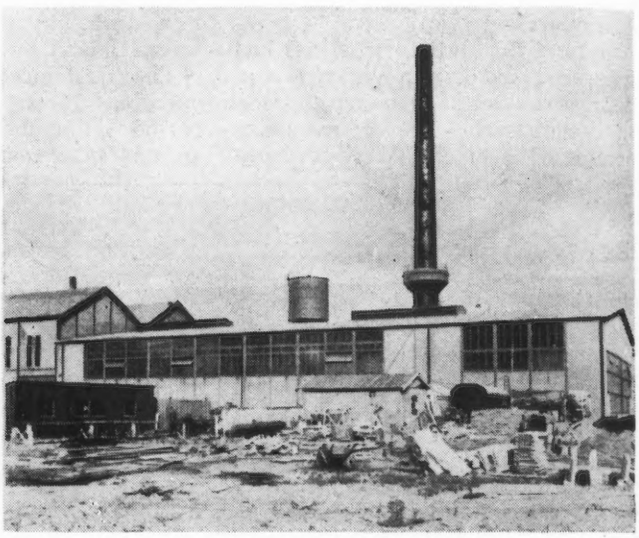
Used for more than a year, the method has proved satisfactory as to cost, flexibility and thoroughness. With it a substantial tonnage has been added to reserves.

Chas. H. Segerstrom, Jr. is president of Nevada-Massachusetts Co., W. G. Emminger, general superintendent, directs operations at Tungsten.



Belgian and Dutch domestic and colonial mineral industries are well on the road to recovery, but interlocking the Benelux union with Western Europe's economy remains a major problem.





ARTILLERY FIRE DAMAGED this tin smelter at Arnhem (left). Repaired plant shown at right.

Mineral Position of ECA Nations

PAUL CATZ
McGraw-Hill World News
Amsterdam, Holland

No. 6—THE NETHERLANDS

STRATEGIC MATERIALS produced by the Netherlands overseas territories are as follows:

Tin. Indonesia (formerly called Netherland Indies, but revised to Indonesia in Dutch constitution). (Banka, Billiton, Singkep).

Bauxite. Surinam (Dutch Guiana); Indonesia (Bintan).

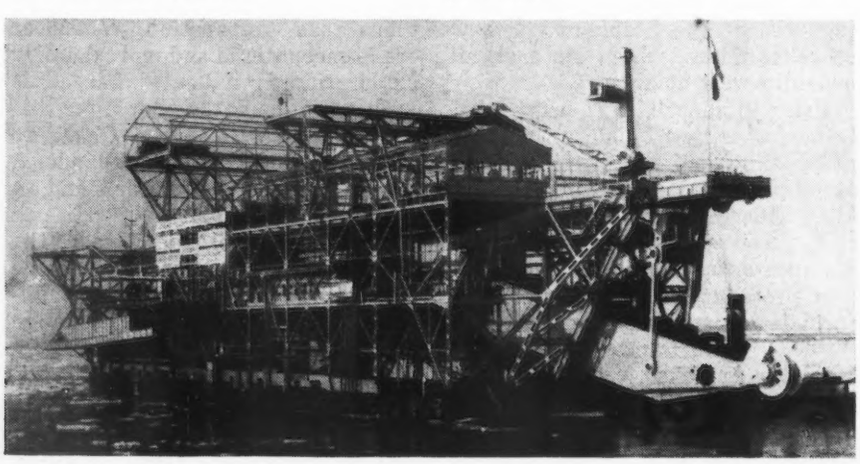
Manganese. Indonesia (Djocjacarta).

Nickel. Indonesia (Celebes).

Tin and lead smelters are located at Arnhem in the Netherlands, and zinc smelters at Budel. The tin smelter of the Dutch Metallurgical Works, Ltd., at Arnhem, an affiliate of the Joint Mining Co., Billiton, was severely damaged by artillery fire during liberation in 1945. Since then the works have been entirely reconstructed. The plant's capacity is said to be about 35,000 metric tons of tin annually.

The Government's Banka tin-smelting plant, which was in operation before the war has not yet resumed operations.

Although the manpower shortage was a problem after the war, it is not a production bottleneck today in either the Netherlands or Indonesia. Up until now, communistic influences have not hampered mining in Indonesia, but recent riots on the Isle of Java are a threat and require close watching. Banka, Billiton and Singkep are situated in Dutch controlled territory. At present employment in tin mining in the Indies totals 25,787 workers.



LARGE TIN DREDGE for use in the East Indies, in Holland before shipment to the East.

The Netherland Indies Government owns five-eighths of the share capital of the Joint Mining Co., Billiton. Tin mining on Banka has always been in the hands of the Netherland Indies Government. In March 1948 the Government entered into an agreement whereby the Joint Mining Co., Billiton, undertakes management of the Banka tin mines for a five-year period. The company will receive payment for management and a small share of the profits.

Tin Mining

All tin deposits in the Netherland Indies are mined by placer methods. After the war eight large dredges were built for the Billiton company, two of them in the U.S.A. These are now in operation. In all, tin mining equipment on Banka, Billiton and Singkep consists of 29 bucket dredges, 5 suction dredges, 55 hydraulicking installations and suction dredges, and 2 large hydraulicking installations.

Smelting plants of the Billiton group are equipped in the most up-to-date manner. This is illustrated by the fact that an U.S.A. affiliate of the Billiton Company Ltd., the Tin Processing Corp., was charged with the construction and management of the important Longhorn (Texas) tin smelter, erected in the U.S.A. The latter plant has been constructed and is being managed according to Billiton methods. Mining Equipment Corp., founded in U.S.A. in 1941, acts as a connecting link between the Billiton group and American industry.

Bauxite

Surinam Bauxite Co., an affiliate of Aluminum Company of America has mining concessions at Moengo and Paranam in northern Dutch Guiana (Surinam). Yearly production of the company totals more than 1,200,000 metric tons. Its drying plant has a capacity of 150 metric tons per hr.

Billiton Co., Ltd., operates a concession near the Surinam company's mines, and produces about 500,000 metric tons yearly. Total production from Surinam was 511,619 metric tons in 1939, and 1,739,137 tons in 1947.

Netherland Indies Bauxite Mining Co. on the island of Bintan has a production capacity of about 600,000 metric tons per year. Damage sustained during the war has been repaired to a large extent, and since June, 1948, mine and plant have been in full operation. Production from Bintan totaled 230,668 metric tons in 1939, 300,000 tons in 1947, and 150,000 tons during the January-June period 1948.

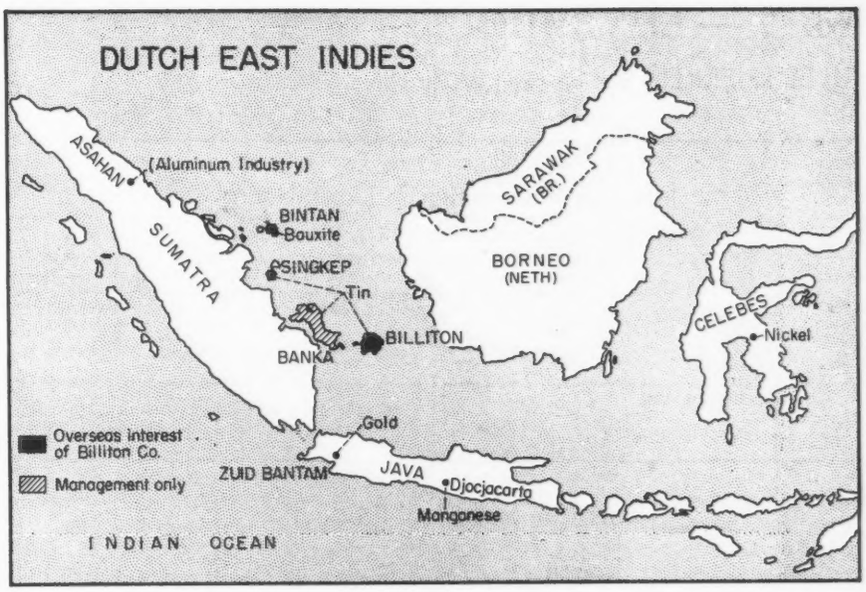
The Surinam Bauxite Co. exports all of its production to the U.S.A. Production of the Billiton company is exported partly to U.S.A.

Before the war a plant to produce aluminum from bauxite was being established in the Netherland Indies; also a plant to fabricate aluminum goods, but these plants were not completed by 1941. As they are not situated in easily accessible areas to the Dutch, no reliable information concerning them is now available.

Manganese was produced from a mine near Djocjacarta, Java, before the war by the General Industrial Mining and Operating Co. Ore production totaled 11,569 tons in 1940. As this territory now lies within the Indonesian Republic, nothing is known about the mine today.

Exploration for nickel on the Isle of Celebes, north of Java, has been in progress, but results are not reported.

A zinc smelter is operated by the Kempen Zinc Co., at Budel, southern Holland. Production capacity is unofficially reported to be 30,000 to 35,000 metric tons of zinc per year. The company employs about 1,000 workers. Imports of zinc ore handled by the company were 45,434 tons in 1938, and 13,968 tons in 1947.



Netherlands Tin Statistics

Production in Long Tons

Tin in Concentrates. Indonesia

1938	27,298
1939	27,809
1940	42,857
1941	51,000
1947	15,915
Jan./June, 1948	13,963

Tin Metal. Netherlands

1938	25,342
1939	14,430
1940[1]	1,158
1947	8,750
Jan./June, 1948	5,519

[1]German invasion in May, 1940.

Apparent Tin Consumption. Netherlands

1947	1,860
Jan./June, 1948	1,020[2]

[2]Marked increase expected for second half.

Netherland Imports. Tin in Concentrates

1947	15,851
Jan./June, 1948	7,800

Exports. Tin in Concentrates

	1947	Jan./June, 1948
From Indonesia to U.S.A.	6,808	5,438
To Netherlands	8,819	10,765
	15,627	16,203[3]

[3]Jan./Sept., 1948, 24,573.

Exports. Tin Metal

From Netherlands	1947	Jan./June, 1948
To U.S.A.	83	70
Other Americas	257	270
Czechoslovakia	465	449
Denmark	133	35
Finland	103	55
France	1,282	1,908
Germany	106	384
Hungary	...	166
Italy	292	30
Poland	495	198
Sweden	801	331
Switzerland	336	274
Yugoslavia	206	235
Other countries	212	264
Total	4,771	4,669

MINERAL POSITION OF ECA NATIONS

No. 7 — LUXEMBOURG

JULES SPIERKEL, McGraw-Hill World News, Luxembourg

Iron Ore Production in Luxembourg

Year	Production (in metric tons)	Workers on Dec. 31	Export in metric tons	Import in metric tons	Stock on Dec. 31
1938	5,140,632	4,031	2,505,797	3,700,075	1,449,633
1946	2,246,908	2,081	539,423	1,968,982	1,802,106
1947	1,992,167	2,145	551,626	2,633,351	2,073,367
1948[1]	1,699,182	2,583[2]	743,149[3]	.....	.....

[1]Jan. through July, 1948.
[2]June, 1948.
[3]Includes 199,654 tons to Germany.

Cast-Iron and Steel Production

	Cast Iron (metric tons)	Steel (metric tons)	Furnaces
1938	1,550,700	1,436,508	19
1946	1,364,616	1,295,292	13
1947	1,818,156	1,714,296	15
1948[1]	1,421,528	1,321,992	22

[1]Jan. through July, 1948.

IRON, STEEL, AND IRON ORE production are the principal items of interest in Luxembourg's mineral economy. In the accompanying tables it will be noted that the extraction of iron ore diminished in 1947 as compared with 1946, and stocks, already high, in 1946, reached a volume never before attained.

In 1938 Belgium and Germany received ore exports. Since the liberation exports were made to Belgium only, until May, 1948, when exports to Germany were resumed.

Imports, principally from France in 1938, have changed their origin since the war. Consumption of French ore has increased slightly in 1947 as compared with 1946, but consumption of Swedish ore has increased 500%.

The fulfillment of the contract concluded with the "Joint Export and Import Agency for Germany" is following a normal pattern. Consultations for the extension of this contract beyond January, 1949, with augmented volume are in progress. Germany's possibilities for absorption depend upon her dollar reserve.

After a temporary set-back in May, 1948, due to holidays, production of iron and steel again took an upward trend in June. This increase in production was followed in July by a slight recession because of a strike in a steel plant.

As a result of improved transportation conditions deliveries of coke from the Ruhr Basin were satisfactory and it was possible to complete the stocks.

Exports to Great Britain and Greece have increased because of new arrangements within the scope of the Marshall Plan.

No. 8—BELGIUM

M. HELBURN, McGraw-Hill World News, Brussels, Belgium

BELGIUM, through the Belgian Congo, has much to offer in the way of mineral resources. She does not, however, have any heavy demand for Marshall Plan aid.

Among the strategic materials found in the Belgian Congo and/or refined in Belgium are: Antimony, cadmium, copper, cobalt, lead, manganese, mica, nickel, platinum, palladium, radium, selenium, tin, uranium and zinc.

ONE OF BELGIAN CONGO'S electrified open-pit copper mines at Kambove.

Main mining areas for copper and tin are shown in the accompanying map. The principal exploiting companies are Union Miniere du Haut Katanga, the Societe Internationale Forestiere et Miniere du Congo, and the Societe Miniere du Beceka.

The Belgian Congo is the world's principal source of industrial diamonds. During 1947 it produced 5,474,469 metric carats, of which 5,083,165 carats were industrials and the balance gem stones. (World production for 1947 was 9,754,231 carats.)[1] Highest production for the Belgian Congo was 10,385,955 carats in 1945. Diamonds are produced in the western mining area contiguous to the Angola diamond fields, and in the eastern area approximately 450 miles northwest of Elisabethville.

Areas in which metals are found are indicated on the accompanying map of southeastern Belgian Congo. Copper mines near Kolwezi are Musonoi, Ruwe, Dikuluwe, Mupine, Kingomyambo; around Kambove,

[1]"The Diamond Industry," by Sidney H. Ball, published by the Jewelers Circular-Keystone.

Shangoluwe, Sesa, Kabolela and Kakanda; near Jadotville, Shituru and Shinkolobwe; near Luishia, Kasongwe and Shandwe; near Tenke, Fungurume; near Elisabethville, Ruashi, Lukuni, Luiswishi, Etoile and Prince Leopold at Kipushi.

Cobalt is associated with copper at the mines of Etoile, Luiswishi, Kakanda, Luishia, Kambove-ouest, Kabolela, Musonoi, Kamoto, Dikuluwe, Mupine, Kingomyambo, Ruashi and Mindigi.

Platinum, palladium, radium and uranium are found in the Shinkolobwe mine. Zinc is mined at Kipushi. Tin is found in the area between Busanga and Lac Upemba.

About half the copper ores are refined in the Congo. In addition to the mines there is a washing plant at Kamoto, and concentrators at Kabolela and Kolwezi which supply copper-cobalt and cobalt to the electric furnaces at Jadotville. From there 40% cobalt alloys are shipped (to U.S.A. principally) and "red alloy" is further refined at Jadotville into ingots and electrolytic copper, much of which goes to Great Britain. A concentrator at Jadotville also treats copper oxide ores before they go to the electrolytic plant there.

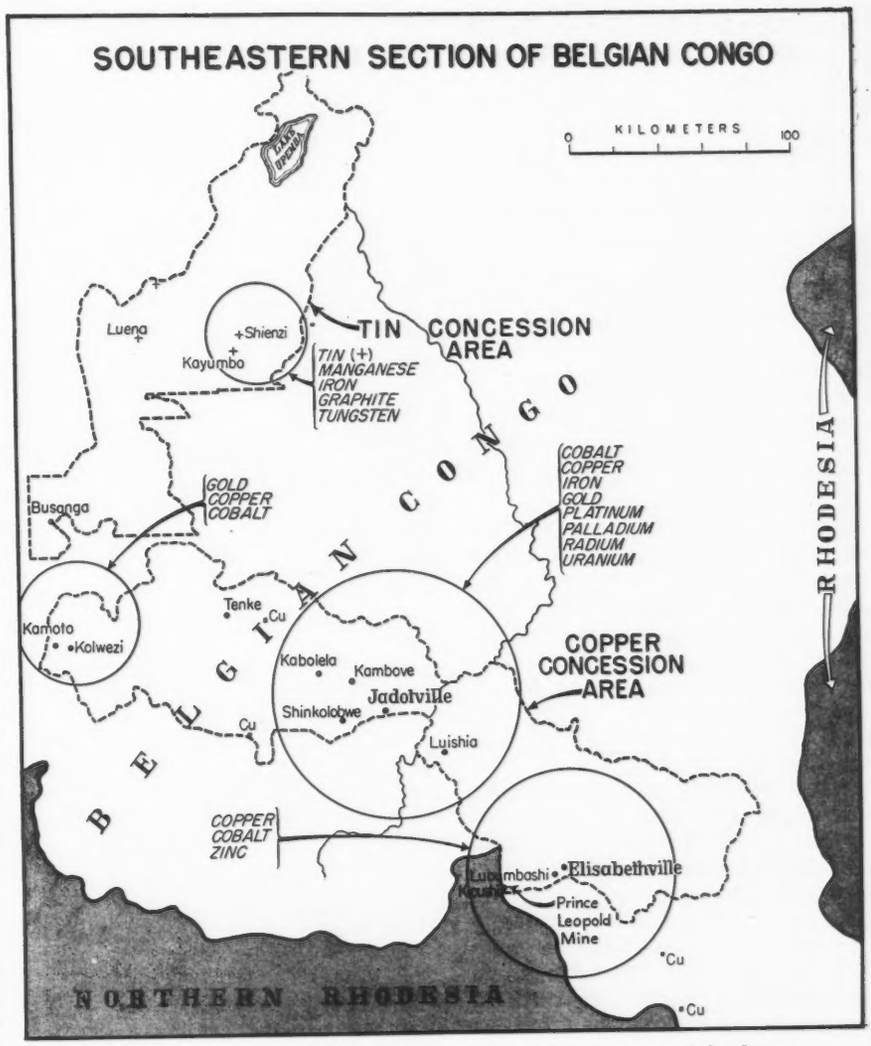
Copper ore is concentrated at the Prince Leopold mine and then sent to the smelter at Lubumbashi where ingots running 98% copper, and matte are produced for shipment to the U.S. for further refining and the recovery of precious metals.

Zinc, cadmium and sulphuric acid are also recovered in electrolytic and roasting plants in Jadotville.

Belgian Refineries

Refining of ores from the Congo, which makes up a large share of the mineral industry in Belgium, is handled by the Societe General Metallurgique de Hoboken which has plants at Hoboken, Mol and Oolen. Other principal companies are the Societe de la Vielle Montagne, with plants at Flone (St. Georges), Valentin-Cocq and Angleur; Usines Metallurgiques de Prayon, with plants at Engis and Foret; the Societe de Overpelt-Lommel, with plants at Corphale (Liege Province) and Overpelt-Lommel; Societe Anonyme de Rothem; Dumont Freres; and the Societe Metallurgique de Boom, which is at present inactive.

Cadmium, copper, lead and tin are handled by the Societe General de Hoboken. Radium and uranium are treated only in their plant at



BELGIUM'S MINERAL STOREHOUSE is in the southeastern part of the Congo.

Belgian Production 1947

Silver-bearing lead	104,450 MT
Other lead	29,710 MT
Gold-bearing silver	249,980 KG
Refined copper	126,190 MT
Fine gold, platinum & palladium	11,440 KG
Antimony, including alloys	1,580 MT
Nickel & tin	12,720 MT
Cadmium & selenium	111,600 KG
Electrolytic zinc	14,500 MT
Copper sulphate	5,200 MT
Salts and compounds containing arsenic, antimony, tin and copper	1,430 MT
Salts & compounds containing thallium	860 KG
Matte, speiss, antimony-bearing lead, slag, etc.	1,450 MT

Belgian Imports of Ores and Concentrates[1]

(Thousands of metric tons)

Type	1938	1947
Copper	40.3	21.3
Zinc	537.2	288.7
Lead	106.7	72.5
Tin	12.1	15.9
Antimony	4.8	4.6

[1]Does not include scrap, crude or semi-finished metals.

Belgian Exports

(Metric tons)

Metal	1938	1947	First 7 Months 1948
Copper	131,400	127,200	61,830[1]
Zinc	173,400	57,000	52,782[2]
Tin	8,600	12,700	5,171[4]
Lead	73,900	20,400	23,103[3]
Aluminum	2,700	1,510	1,625[5]
Silver	250	100	82[8]
Nickel	3,000	100	20
Cadmium	500	130	777[7]
Antimony	2,700	1,160	310[6]

[1]Includes 46,721 tons crude; 15,109 tons semi-finished, wire, etc.
[2]Includes 44,827 tons crude; 7,955 tons semi-finished.
[3]Includes 18,338 tons crude; 4,765 tons semi-finished.
[4]Includes 5,081 tons crude; 90 tons semi-finished.
[5]Includes 1,129 tons crude; 496 tons semi-finished.
[6]Includes 284 tons crude; 26 tons semi-finished.
[7]Includes tungsten and other metals.
[8]Includes gold and platinum.

Belgian Production[1]

First 6 Months, 1948

Copper	104,817 MT
Zinc	95,676 MT
Lead	43,233 MT
Tin	7,114 MT
Aluminum	4,431 MT
Antimony, cadmium cobalt nickel, etc.	2,057 MT
Silver, gold & platinum	141,609 KG

[1]Includes crude and semi-finished non-ferrous metals.

Belgian Consumption

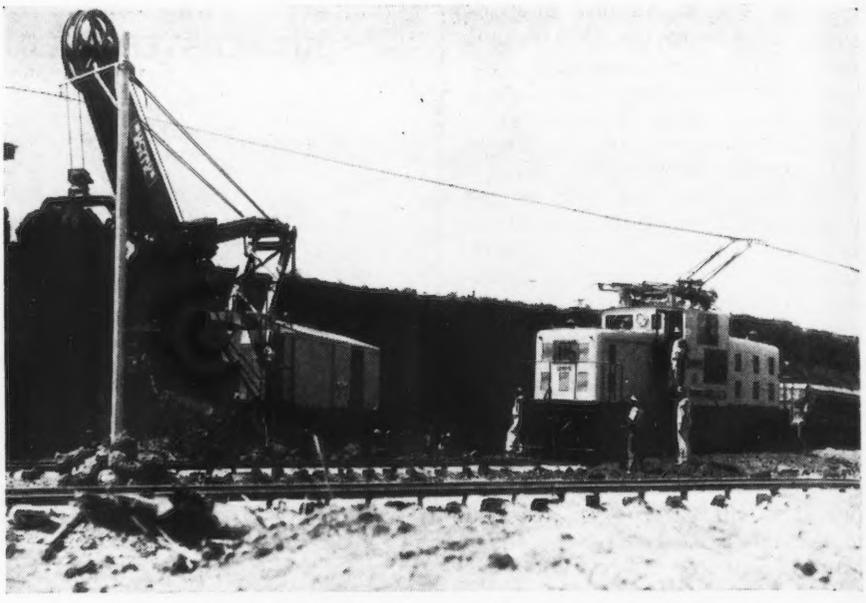
(In short tons)

Metal	1938	1947
Copper	33,620	67,200
Lead	38,600	28,000
Zinc	112,400	54,600

Oolen. Zinc is refined by La Vieille Montagne, Prayon and Overpelt-Lommel. Lead is refined by Dumont, Prayon, Overpelt-Lommel and Rothem.

The mineral industry in Belgium does not lack manpower, although there is no surplus of unemployed. It is mechanized enough to narrow its needs of skilled laborers, which Belgium lacks at present, and employs principally laborers and professionals. Production is generally efficient, not disturbed by nutritional or political shortcomings, although there was a strike in June for higher wages. There is very little communist influence and no more for nationalization.

In the Congo the large demand for mine labor has required a complete program of recruitment and training. Mine managements have built up and administered an entire social system. Food and quarters are part of wages for the native worker. Schooling for his children, medical care, recreational programs, etc. provide all needs. Schools lean toward providing a preparation for the mines for boys and domestic science for girls. Highly specialized training is limited for natives, however. There is criticism of this paternal system, but miners' families are so much better off than other natives, that they are proud to have their children continue in the trade.



AMERICAN-MADE ELECTRIC SHOVEL and locomotive at the Ruwe mine.

NATIVE WORKERS on the 200 level of the Prince Leopold mine, a major zinc producer.

Mines Are Mechanized

There is no nationalization. Strikes are virtually unknown. Until this year, mines have been under the same social and security regulations as other industries in the Congo. A new Corps des Mines is now taking over inspection.

Congo mines in general are well advanced and mechanized. Proficiency is high and research is carried on continuously by the large mining companies out of their ample profits. Surface mines use electric and diesel shovels, electric and diesel locomotives, wagon drills, twenty-ton diesel trucks.

Smaller mining equipment is mostly made in Belgium which provides a good exchange between colony and mother country. Heavy equipment is mostly imported from the U.S., although locomotives are now being built in Belgium, under license from Westinghouse.

Belgian expenditures for conversions and improvements in the refining and smelting industry in 1947 amounted to 250 million francs, only one half of the estimated investment needs based on a 10-year re-equipment program. This is due largely to the attitude of the big companies to wait and watch. Ore imports have increased slowly since the war, and are generally not up to prewar levels. There is a limit to the amount of concentrates which can be transported from the Congo to Belgium every month (10,000 m.t.) which has led to a project for a zinc plant in the Congo with a minimum capacity of 3,000 metric tons a month. Production means in 1939 were well developed technologically and the big refiners considering all these points feel that the superiority of new methods in returns on investment has yet to be sufficiently proved. As an example of their withdrawal, the principal zinc producing companies have abandoned for the moment a cooperative project to test a plant with vertical retorts.

Belgium's present prosperity among European nations is at least partly due to the dollar balance it was able to build up from Congo exports during the war. Because of this prosperity a large share of Marshall Plan aid allotted to Belgium is earmarked for other countries in the form of Belgian franc credits. This means that only about 20% is available for re-equipment. The need for minerals during the war, stimulated technological advancement and mechanization, and since mines in the Congo received no direct damage from the war, little is needed beyond regular replacement, and probably no ECA dollars will be allocated.

ELECTROLYTIC COPPER is produced at this plant in the Jadotville area of the Congo.

ELECTRIC FURNACES in a copper-cobalt refinery at Jadotville treat Congo concentrates.

No. 9—DENMARK

H. PASDERMADJIAN,
McGraw-Hill World News, Copenhagen, Denmark

DENMARK is virtually without natural mineral resources, peat coal and limestone being the only resources worth mentioning. Consequently, metal and mineral imports are high, particularly because of growing industrialization and relatively high living standards of her 4,000,000 inhabitants. Denmark's activities are not confined to agriculture, as is commonly believed.

Imports of ferrous and non-ferrous metals are high because the manufacturing industry is striving to meet domestic requirements and build up a strong export market as well. These industries include building; shipbuilding (annual capacity is more than 200,000 tons); machine building (diesel motors constitute the main export); cement manufacturing equipment, and dairy equipment.

Danish requirements for iron and steel, and iron and steel products are about 500,000 tons per year. Previous to 1940, Denmark had no steel industry. But since then, a steel mill has been erected in combination with a rolling mill. Its capacity is 40,000 tons a year. This mill will use a considerable portion of the 75,000 tons of scrap which previously had been exported annually.

Annual requirements of non-ferrous metals are approximately as follows: copper, 10,000 tons (about one-half as ingot, the balance in semi-finished form); zinc, 8,000 tons (about one-half in ingots and the balance in semi-finished products); tin, 700 tons; lead, 8,000 tons (mostly ingot); and aluminum, 2,000 tons (about one-half in ingot and the balance in semi-finished form). These figures represent an approximation of Denmark's normal needs rather than those reported in the post-war years when imports were abnormally high in some commodities to offset shortages caused by the war.

Greenland

Mineral production in Greenland, a Danish possession, consists of cryolite for use in the production of aluminum. As the cryolite deposit in Greenland is the only natural one which could be worked commercially, Denmark has had somewhat of a monopoly in the past. More recently, processes have been developed to produce synthetic cryolite, and have been used in aluminum producing countries. Thus cryolite ceases to be a strategic material. The Greenland deposit which has been worked since 1856 is now producing about 30,000 tons a year and will probably be exhausted within 10 or 20 years.

During recent months it has been reported that substantial deposits of lead and uranium have been discovered in Greenland, but no detail as to the extent and grade of these deposits has been released to date. Some doubt has been expressed as to the feasibility of working these deposits because they are situated in a part of the country where the nearest harbor is open to navigation for only six weeks a year. [Persistent reports have appeared in the British and American press stating that Dr. Koch, leader of the Danish party which made the discovery, claims the existence of at least a million tons of lead ore. These reports have not been confirmed officially.—Ed.]

Because of Denmark's dollar shortage, imports of American minerals, metals, equipment and machinery will be restricted to those items which cannot be obtained from other sources.

SEVEN-TON BATTERY LOCOMOTIVE carries a 536-amp. hr. battery, hauls 16 trains of 864 tons 3,720 ft. Motorman is Truman Patterson.

Battery Locomotive Haulage

Per-ton-mile cost is about the same as for the type of haulage previously used. With other special factors, there appears to be a net advantage with batteries at the Ducktown mines

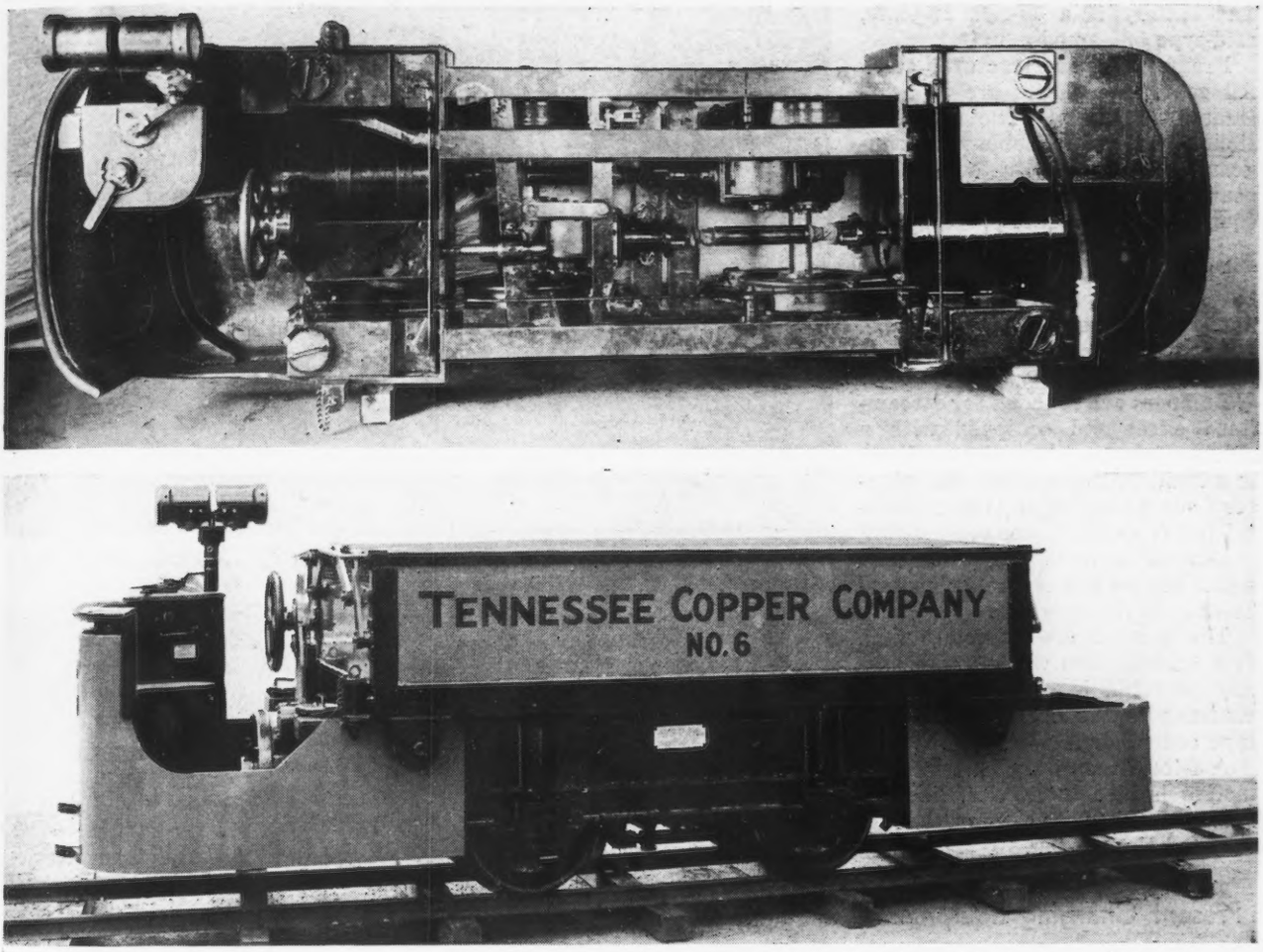
LAMAR WEAVER
Superintendent of Mines
Tennessee Copper Co.
Ducktown, Tenn.

CHANGE-OVER from direct-current trolley haulage to the use of storage-battery locomotives in the mines of Tennessee Copper Co. came about during World War II as a result of the company's need of a bigger production of ores high in sulphur and iron. Mining of such ores in its mines in the Ducktown Basin produced an explosive dust. Electric blasting had been substituted for blasting with cap and fuse, permitting the round to be shot from a safe distance. However, stray current from the d.c. trolley system could cause a premature explosion, the ore itself being an almost perfect electric conductor. Unexpected problems arose, moreover, such as finding high voltages when drifting from one orebody to another through a rock section. No accidents had occurred from this cause but interest in eliminating the condition was high. Dan Harrington, of the U. S. Bureau of Mines, was invited to make a survey of this stray current. In September, 1943, Messrs. Griffin and Gleim of the Bureau's Pittsburgh laboratory complied.

Thirty-one years before, in 1912, the company had bought its first mine locomotive. This was a 4-ton, 250-v. d.c., trolley locomotive, which was placed in the Burra Burra mine. Other locomotives were added until 1940, the last year a trolley locomotive was purchased. By then, the company had five 6-ton, and five 4-ton trolley locomotives.

Between 1922 and 1940, a period of 18 years, three men had been killed by contact with the trolley wire. Various others had received severe shocks, and some motormen had been troubled by eye burns caused by arcs. But these occurrences had not been sufficient to cause a demand that only battery locomotives be used.

The company had previously acquired three 5-ton, two 4-ton, and two 3-ton storage-battery units, making a total of 17 locomotives with the 10 trolley units already mentioned. The battery locomotives had first been used where d.c. current was not available. The three 5-ton units mentioned had been ac-



CHASSIS of 7-ton battery locomotive, seen from above, showing motor drive and gears; also a side view of the locomotive.

at Tennessee Copper's Mines

quired to speed the driving of a long, 9x9-ft. haulage drift to the Boyd orebody from Burra Burra shaft. As late as 1941, the battery locomotive had not been accepted as a dependable source of power for hauling ore more than 500 ft.

In the Bureau's survey of 1943, tests were made to determine the effectiveness of grounding and insulation resistance as effected by underground conditions. The investigators' report stated that: "The tests in Boyd mine in which squibs did not fire until the trolley locomotive was loaded (brakes applied), point to the conclusion that it may be difficult, if not impossible, to eliminate dangerous stray currents entirely from direct-current sources as long as trolley haulage is employed."

Since electric detonation was a necessary part of the operation, an investigation of other types of locomotives was made.

In September, 1944, the mining department proposed to the management that the d.c. trolley locomotives in service be replaced with storage-battery locomotives. The reason given was that blasting would be safer, likewise travel in the haulageway. It was also stated that removal of the d.c. feed line from the timbered shafts would reduce a potential fire hazard.

The battery locomotives were put in service during 1945. All of the trolley locomotives, the three d.c. motor-generator sets, and spare equipment were sold.

Desirable features in a locomotive are: (1) Sufficient room to make the motorman comfortable. (2) A stout guard around him to protect him in case of a wreck. (3) Headlamps for lighting in either or both directions above the motor or cars. (4) Seal-beam lamps. (5) Simple, effective controls, such as the horn, foot brake, parking brake, and controller brake. These items are important. They improve the motorman's morale and his pride in the locomotive. Streamlined appearance and mechanical modernization also are desirable.

Two sizes of battery locomotives were then purchased, 5½-ton and 7-ton, to operate on a 24-in. gage track having a minimum radius of curve of 14 ft. They were built by the Greensburg Machine Co., Greensburg, Pa., and have Westinghouse motors and controllers.

The 5½-ton locomotive is equipped with one 20-hp. motor that will develop a speed of 4 to 7 mph. The battery is a 48-cell, 25-plate, acid-type unit having a capacity of 480 amp.hr.

The 7-ton locomotive has two 20-hp. motors. Located in the front and rear respectively, each drives the truck on the end opposite to it through a double-reduction transmission gear. Speed is 4 to 7 mph.

The battery is a 48-cell, 29-plate, acid-type 536-amp.hr. unit.

Frames are of structural steel. All gears and shafts are of heat-treated alloy steel. The transmissions are of the double-reduction-gear type, with adjustable roller bearings throughout. They are also equipped with seals to prevent leakage of oil.

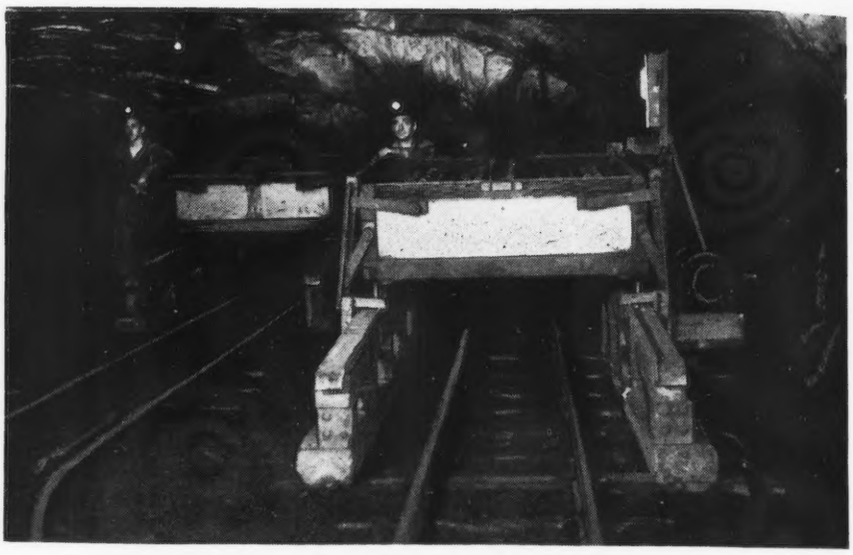
The journal boxes have roller bearings with a bronze adjusting nut and are mounted in the frame between renewable plates to protect the side frames.

Bumpers are rounded for streamlined effect and equipped with a shield of $\frac{5}{8}$-in. steel plate. There is a hand rail to protect the operator from a blow or prevent accidental fall from the motor seat.

Control buttons for horn and lights are on the controller end accessible to the operator.

The motors are equipped with foot brakes. The wheel brake usually provided is elevated for convenience to the operator. A cam-type controller is used.

A 4-ton Greensburg battery locomotive is also in service, likewise seven Manchas, two 3-ton, two 4-ton, and three 5-ton.



BATTERY-CHARGING STATION in Boyd mine of Tennessee Copper Co.

THE STATION (same as in top picture) is well ventilated and practically fireproof.

Present Charging Equipment

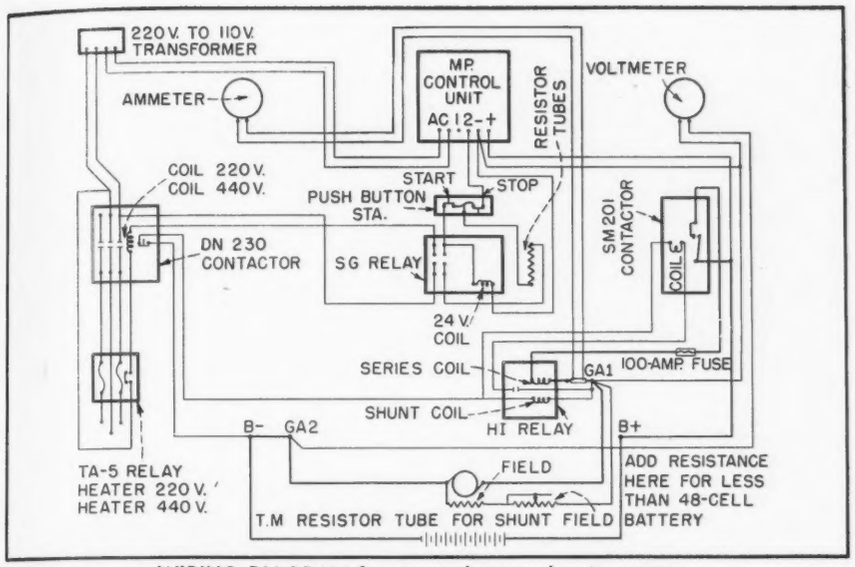
Up to 1943, the charging equipment used consisted of a motor-generator set with an ampere-hour meter on the battery box. However, the meters were very difficult to maintain due to vibration, shock and moisture. Subsequently, the ampere-hour meter was placed on the charging panel and the motorman would set it from a specific-gravity reading chart.

Today, small motor-generator sets are used for charging instead of the central d.c. bus, because batteries are widely scattered, both vertically and horizontally. The starting of the generator presented no problem. It was necessary, though, that the generator should shut down automatically when the battery was fully charged. It was also necessary to provide some means of disconnecting the battery from the generator automatically should the power be cut off. Inasmuch as some batteries would be charged on shifts when no one was in the mine, it was also desirable to have charging resumed automatically when power came on again.

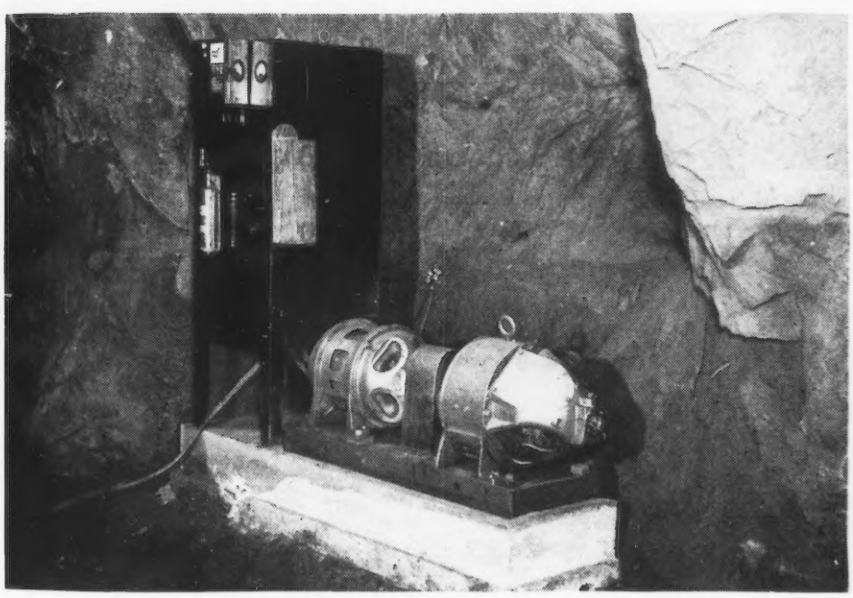
All of the conditions mentioned were met by use of an Exide MP control unit in conjunction with several relays. This is illustrated in the wiring diagram. Complete metal-clad charging panels were purchased containing the MP unit, all necessary relays, a.c. and d.c. protective equipment, and the generator field rheostat.

To put a battery on charge, it is necessary only for the motorman to plug it in, turn the knob of the MP unit against the stop, and push the start button. From then on, charging is automatic (regardless of the state of charge until the battery is fully charged. The generator then shuts down and disconnects the battery from the generator. When the generator has to start again following a power outage, the push-button station is not used and the generator is started by turning the knob of the MP unit against the stop.

The sequence of relay operation during charging is as follows: Power from the battery to be charged is used for starting the generator, so it is necessary that the battery be plugged in and be making good contact first. With the MP timing knob turned against the stop, battery current is supplied to the push-button station. When start contact is made, the S.G. relay closes and the battery current is locked through the stop button. When the S.G. relay comes in, the coil on D.N. 230 AC contactor is energized, closing contacts to the a.c. motor and completes the circuit through the D.D. shunt coil. When the generator has built up the voltage to the predetermined value, the HI relay contact closes, energizing the coil on the SM 201 contactor. When this contact closes, the battery is directly across the generator leads. When the state of charge is reached that



WIRING DIAGRAM for storage-battery charging station.



CHARGING PANEL with MP control unit shown in above diagram.

the battery voltage is at a predetermined value, the PQR relay in the MP unit reacts and starts a clock that drives the shut-off mechanism to the off position. This can be set from one to seven hours. Shunt-wound generators, with taper current characteristics, are used and automatically taper to correct finish charge rate.

Motormen are instructed in the care and safe operation of a locomotive and battery before being certified for duty by an electrician and safety inspector. They know how to inspect and do minor repairs involving the controller, brakes, lights and lubrication. They are responsible for charging.

Procedure for maintaining batteries properly is prescribed in certain instructions, as follows:

1. Be sure that the charging plug is in tight before attempting to start the charger.

2. Never bring a lighted match or open flame near the battery.

3. Never lay a tool or any piece of metal on the battery.

4. Always keep the filler caps in place except when necessary to have them open for filling or checking.

5. Always have box lids open when charging, as ventilation is necessary.

6. The solution in the battery should never be below the plates. This should be checked in several cells each time the battery is put on charge. Add battery water as needed. If necessary to add water at other than the scheduled time, note this on your report.

7. Exercise care when adding water to avoid filling above bottom of filler cap tube.

8. The cell trays and battery compartment must be kept clean and dry.

9. The state of charge in a battery is determined by the specific gravity of the electrolyte. The full-charge specific gravity is 1.265 to 1.285. A hydrometer is located in a wooden box at each station.

10. Overcharging will cause a battery to heat. This will damage it. Do not start the charger on a charged battery, except on authorization for the equalization charge, which is taken care of in the charging schedule.

11. Pull motor plug out before working on battery or locomotive.

A Cost Comparison

It was during 1945 that the other locomotives were all replaced with battery locomotives. For making a cost comparison the years 1943 and 1947 were selected as most representative. These years represent respectively a period of two years before and two years after the change-over. Actual cost records, meter readings and estimates of battery life were used.

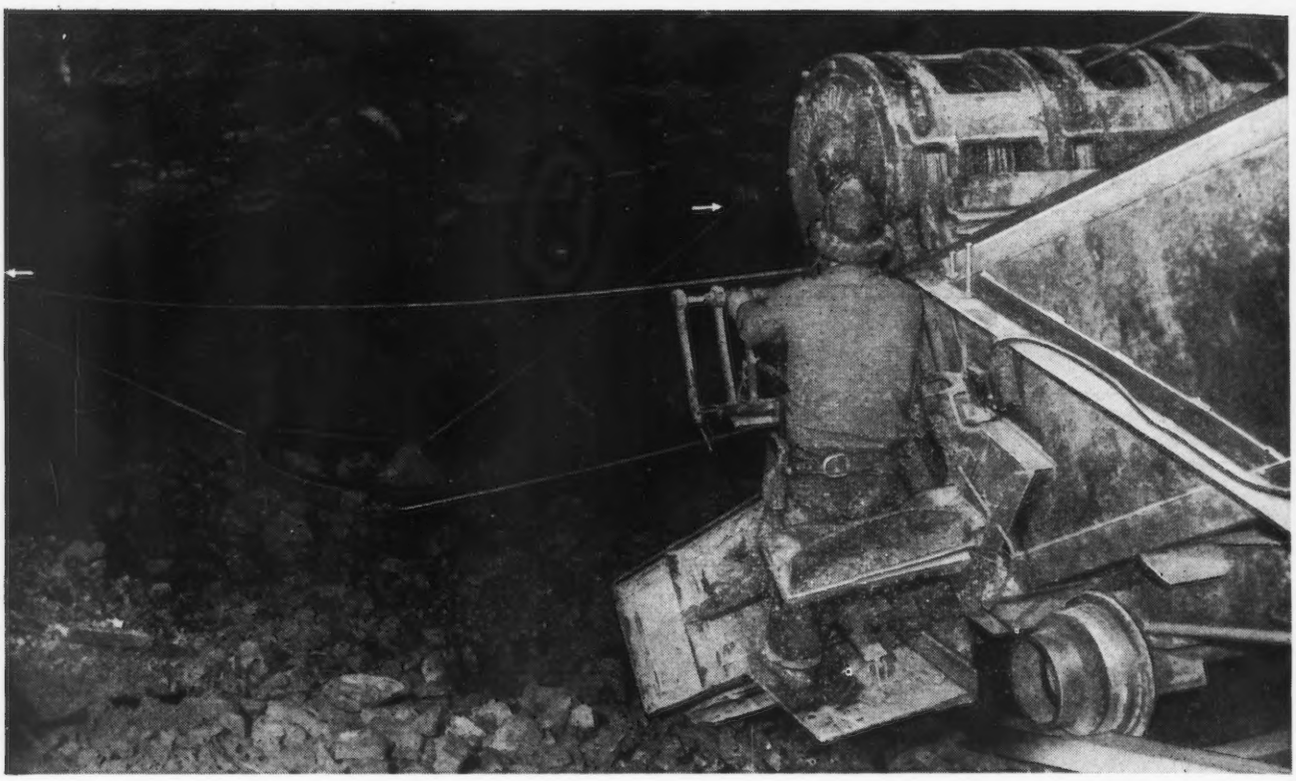
Labor rates and material costs increased about a third from 1943 to 1947, which is added to the 1943 costs. The average length of haul has increased from 2,482 to 2,719 ft. In making a comparison of locomotive haulage costs, the unit "ton-mile" was used.

Battery depreciation is computed on a replacement life of only five years, whereas we originally estimated a life of five and a half years.

The comparison shows that the per-ton-mile cost for the two types of locomotives is practically the same after corrections have been made in labor and material costs. The difference was $0.002 per ton-mile in favor of the battery locomotives. The hidden costs of accidents and extra cost in track bonding, work in haulage drifts and improvement in safety obtained by electric blasting are therefore a clear profit.

The battery locomotive has been very dependable. Short outages of power on surface have no effect on it. Instead it continues at its work.

In purchasing equipment for battery haulage, it is profitable to get everything needed of the required size, even though the first cost may be discouraging. The returns in dependability and lowered maintenance will be appreciated.



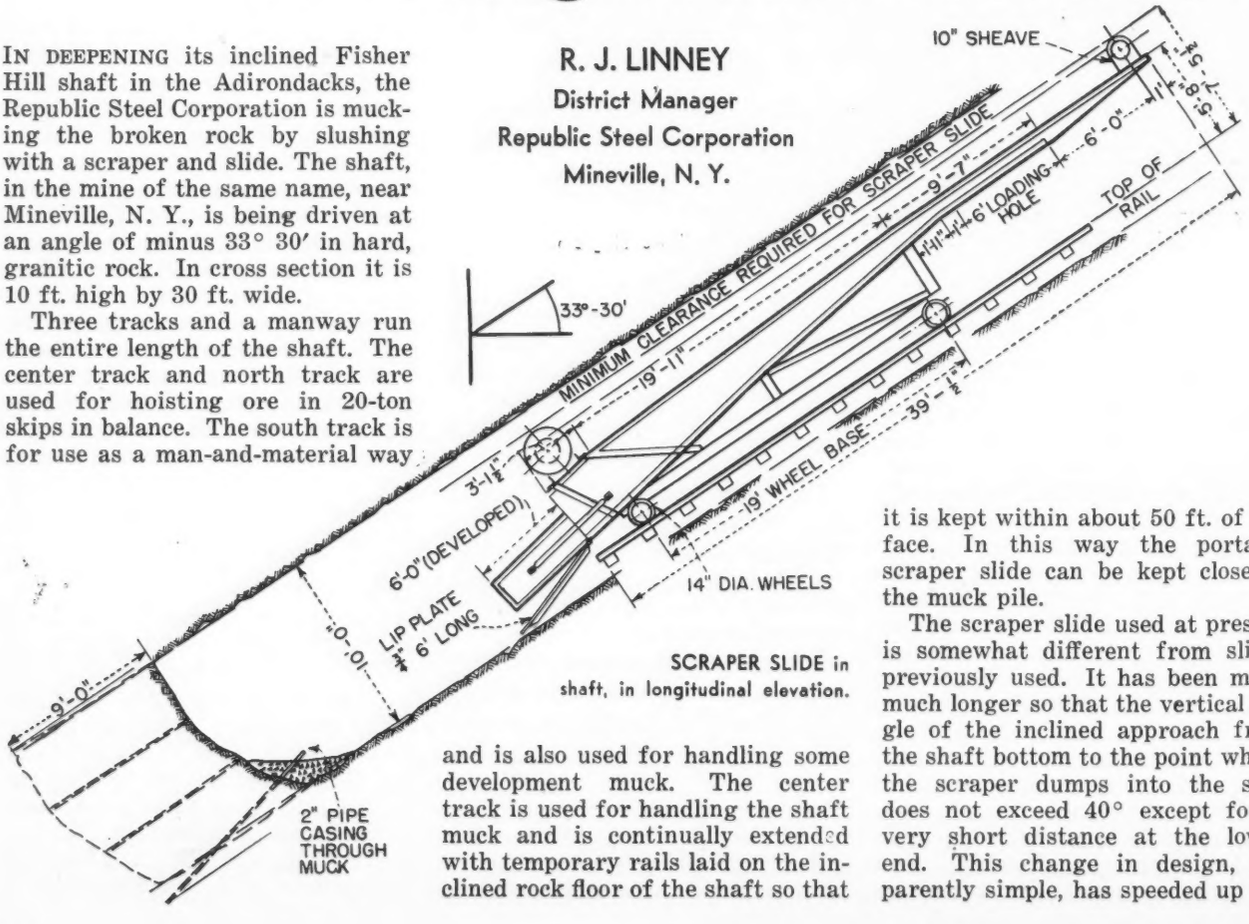
THREE-DRUM TUGGER HOIST is mounted on the slide. The scraper is starting to pick up its load of broken rock in the shaft bottom. The arrangement of the snatch blocks in the face is shown by the arrows. The shaft is inclined at 33° 30', as shown below.

Mucking Fisher Hill Shaft

R. J. LINNEY
District Manager
Republic Steel Corporation
Mineville, N. Y.

IN DEEPENING its inclined Fisher Hill shaft in the Adirondacks, the Republic Steel Corporation is mucking the broken rock by slushing with a scraper and slide. The shaft, in the mine of the same name, near Mineville, N. Y., is being driven at an angle of minus 33° 30′ in hard, granitic rock. In cross section it is 10 ft. high by 30 ft. wide.

Three tracks and a manway run the entire length of the shaft. The center track and north track are used for hoisting ore in 20-ton skips in balance. The south track is for use as a man-and-material way and is also used for handling some development muck. The center track is used for handling the shaft muck and is continually extended with temporary rails laid on the inclined rock floor of the shaft so that it is kept within about 50 ft. of the face. In this way the portable scraper slide can be kept close to the muck pile.



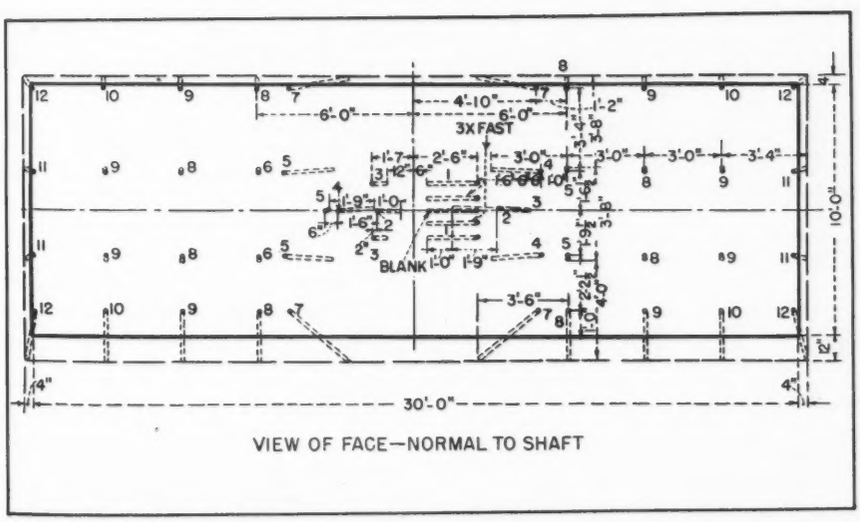
SCRAPER SLIDE in shaft, in longitudinal elevation.

The scraper slide used at present is somewhat different from slides previously used. It has been made much longer so that the vertical angle of the inclined approach from the shaft bottom to the point where the scraper dumps into the skip does not exceed 40° except for a very short distance at the lower end. This change in design, apparently simple, has speeded up the

LENGTHENING SLIDE has made it possible for scraper to ascend it at angle not exceeding 40° save at lower end.

AT TOP OF SLIDE, scraper delivers its load to the skip which is directly behind slide and above it on the 33½-deg. incline.

With a Scraper



VIEW OF FACE—NORMAL TO SHAFT

SHAFT ROUND in plan view. The rounded bottom corner, shown in drawing on opposite page, is easier to muck than a square corner would be.

scraping time approximately 25%. The slide was made considerably heavier than the old slide. The ore hoist, however, easily pulls it back out of range of possible damage from blasting.

The accompanying drawings show the general dimensions of the shaft and the pattern of the drill round. The rounded corner of the bottom is important. The 5-cu. ft. semi-box-type scraper does not have to waste time scraping down into a tight corner which would result from blasting a perfectly square face. Some of the muck is left in the face and is drilled through by using casing pipe. This speeds scraping. The digging angle of the scraper is 55° to the direction of pull. The scraper weighs about 2,500 lb., this weight aiding it in digging into the muck pile.

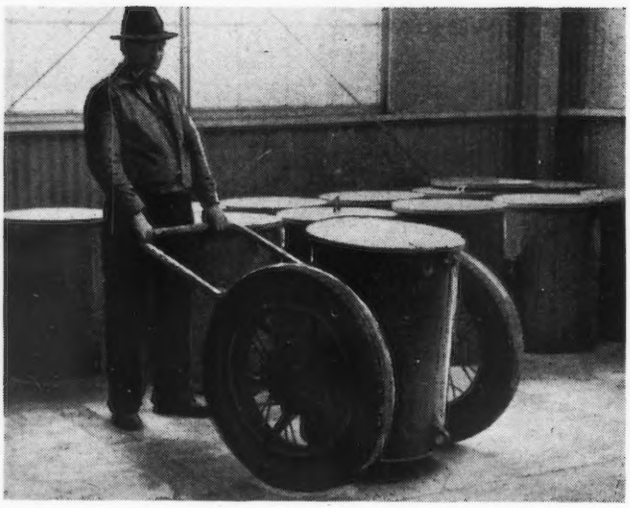
One shift drills the round and fires it. The cut and center section are shot first and the sides are then slashed.

The second shift scales the roof, drills pin holes for the scraper snatch blocks, wets down to eliminate dust and moves the slide into position, binding it down to the rails with special clamps and turnbuckles. Then, if possible, it begins scraping.

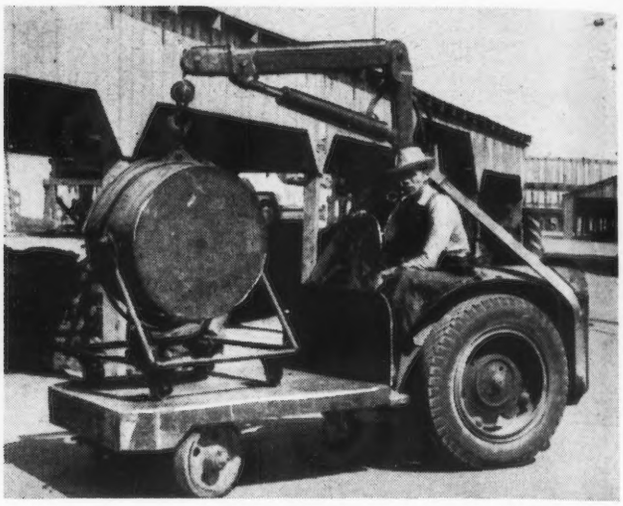
The third shift finishes the work of scraping, pulls the slide back out of the way of the next blast, and lowers the drilling equipment in a steel boat by a double-drum tugger hoist. If time available permits, they prepare the setup for the drillers who will return on the next shift.

The pictures show how the three-drum scraper hoist is mounted on the slide and how the snatch blocks are arranged in the face. They also show the scraper entering the slide and dumping into the skip from the top of the slide.

The application of this new slide and the sequence of operations has made it possible to average an advance of about 33.6 ft. per week or 7 ft. per round. A total crew of nine men is used in the entire sinking operation.

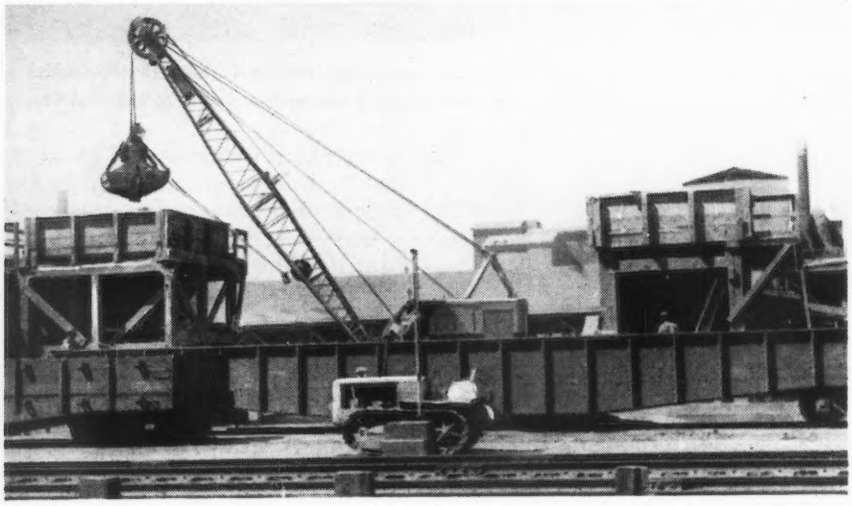


RUBBER-TIRED BUGGY handles cans of samples from sample mill.



PLANT MAINTENANCE department uses this handy 2-ton crane.

Standard Materials Handling Units



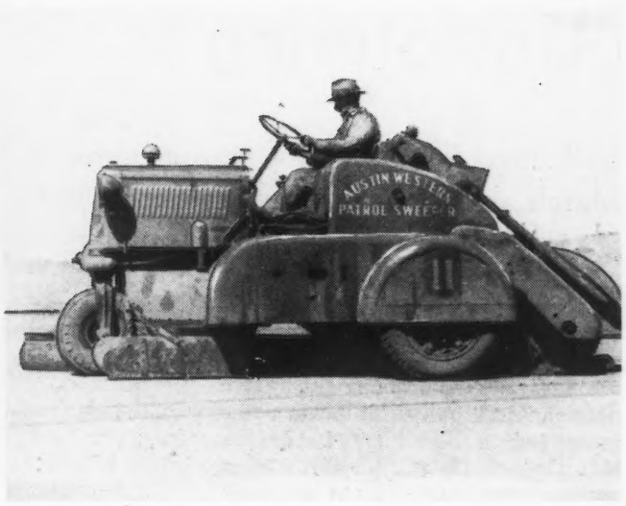
DIESEL-POWERED CRANE removes ore, lime rock, coke breeze, etc. from freight cars and dumps them into hoppers feeding conveyor belt or trucks. Note tractor car spotter.

DUMPSTER UNIT mounted on a standard 5-ton truck picks up and transports 3-yd. steel bucket. Loaded bucket weighs 3 to 6 tons.

THE SELBY PLANT of American Smelting and Refining Co. on Carquinez Straits some 35 miles northeast of San Francisco, Calif., is a combination custom lead smelter and refinery, which receives ore and concentrates from many parts of the world and from mines active along the Pacific Coast of the United States. Deliveries are made by ship, rail and truck. Large shipments are stored separately and at widely scattered point on paved areas, while small shipments, most sacked, are depjosited in covered storage sheds. Consequently efficient handling of ores, concentrates, and other materials required in smelting and refining operations is imperative.

Originally, plant materials and furnace feed were handled in hand or locomotive drawn cars over a rail system connecting various smelter departments. Much time and effort were consumed. Though previous improvements were made to offset increasing labor costs, it was after Pearl Harbor that modernization of the inter-plant transportation system became imperative to meet increasing demands for metals, cope with an acute manpower shortage, and improve overall plant efficiency. Continuing rising labor costs and demand for increased plant output extended this requirement into the postwar era. What has been accomplished in improving handling of materials by mechanical means is shown in the accompanying illustrations. Some of the jobs done by standard materials handling units around the plant are of interest to smelter and refinery men.

HALF-TON CLAMSHELL removes 60 tons of copper dross daily.

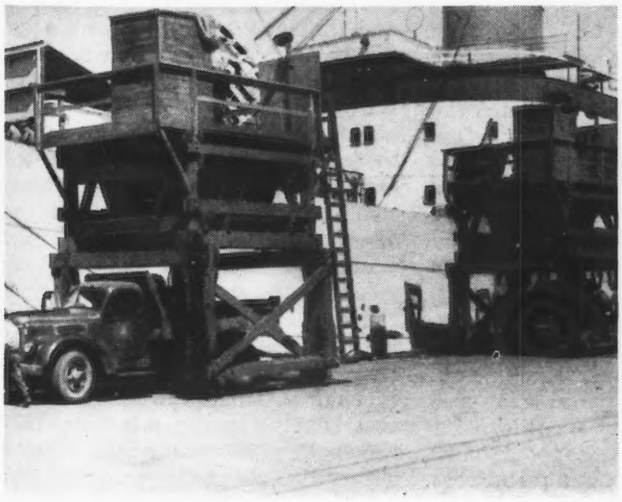


PATROL SWEEPER cleans up concrete concentrate stocking areas.

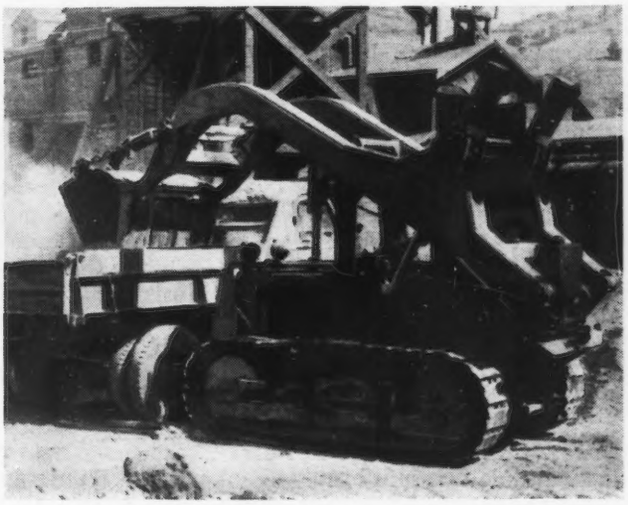
Perform Unusual Jobs at Smelter

SACKED ORE and materials are delivered by ship or rail and carried to storage sheds with pneumatic-tired lift truck.

SMALL PAYLOADER removes dust from baghouse and dumps it into Dumpster buckets for transport to the mixing beds.



CONCENTRATES brought in by ship are discharged into rail-mounted wooden hopper for loading dump trucks.



TRACTOR-MOUNTED DOZER shovel with ¾-yd. bucket reclaims ore from stockpile to truck for delivery to mixing floor.

Unwatering of Fad Shaft Progresses

Sixth level where flow was encountered in crosscut last March should be reached at early date. Volume to be handled has been greater than estimated.

THE FAD SHAFT of Eureka Corporation, Ltd., at Eureka, Nev., was sunk to a depth of 2,415 ft. to develop a lead-zinc orebody cut by five diamond-drill holes. This work was completed in December, 1947 (E& MJ, Dec., 1947, pp. 62-64), and a crosscut was started from the sixth level (2,250 ft.) to reach the ore zone. When this was 135 ft. from the shaft a water door designed to withstand 250 psi. pressure was installed. Pumping capacity was increased to 2,500 g.p.m. from the 1,200-1,600 g.p.m. pumped for several months previously. The 2,250-ft. level station is in a dry shale formation. Before the crosscut was started it was known that the heading would soon leave the dry shale and pass through the Martin fault into wet dolomite about 50 ft. from the west end of the station.

With the safeguards mentioned, the crosscut was driven to a point 170 ft. from the station. Here a flow of 2,000 g.p.m. was cut, bringing the total to about 3,500 g.p.m. This was nearly 1,000 g.p.m. more than available pump capacity. The water door was closed. There was no great inrush. As near as could be determined, the pressure on the door was about 450 psi., indicating a 1,000-ft. head. Two pipes in the concrete bulkhead, in which the steel door had been set, burst under this pressure and the sixth-level pump station was flooded.

Effort was then made to save the next pump station above, on the fourth or 1,700-ft. level. Here the water was held about 2 hr., though gaining an inch every 10 min. To save the pumps in the shaft, the third level was also abandoned. The water continued rising until the water-table level was reached at 1,050 ft. from the shaft collar. Some of the shaft pumps were saved but all stationary units were flooded.

Unwatering Planned

Plans were at once prepared for unwatering the shaft. The following schedule was laid out:

1. Install sufficient power immediately to pump 5,000 g.p.m. from the sixth or 2,250-ft. level.
2. Enlarge the second level (800-ft.) station, making room for 6,000 g.p.m. pump capacity. Then install 5,000 g.p.m. pump capacity.
3. Unwater to the third or 1,200-ft. level, and install 5,000 g.p.m. pump capacity.
4. Unwater to the fourth or 1,700-ft. level, and enlarge and install 5,000 g.p.m. pump capacity.
5. Unwater to the sixth or 2,250-ft. level, increasing pump capacity to 6,000 g.p.m.
6. Increase power and pump capacity to 6,000 g.p.m. unless this should appear unnecessary.
7. Re-enter the sixth level crosscut after strengthening the original water door and installing a second one in the ore-pass crosscut.

Additional pumping and power-generating equipment was required immediately to carry out the program. Installation of two 1,000-kw. Worthington diesel units then under way was hurriedly completed. Two 800-kw. GMC diesels were ordered, providing a total of about 5,500 kw. It was planned to dry the motors and other flooded equipment as it was reached. Additional station pumps, I-R 4G.T., driven by 250- to 450-hp. motors, were acquired. Shaft pumps chosen were B-J submersibles of 350 hp., rated at 2,000 g.p.m. against a 550-ft. head.

The Work Is Begun

Pumping was begun May 16, 1948. The average pumping rate at the start was 2,300 g.p.m. The third level was reached May 22. One B-J submersible pump and two Pomona sinkers were used during this stage. The pumping rate at the third level was about 3,000 g.p.m. On the third level, the pump station was prepared for lowering the water by installing five station pumps. An additional B-J submersible pump was put into service June 16. By July 12 the water was lowered to the fourth level. At this point the pumping rate was about 6,000 g.p.m. Pumps and power plant were doing better than expected. The fourth-level pump station was then enlarged and equipment installed to handle about 7,000 g.p.m. Three B-J submersibles were put in operation Aug. 25, and the water was lowered to 1,961 ft. from the collar by Sept. 12. The average volume pumped during this period was 6,800 g.p.m. Several delays occurred through failure of the B-J pump motors and power shutdowns. On Oct. 15 the water was being held at about 1,961 ft., and pumps were delivering 6,600 g.p.m. to surface.

The two new 800-kw. diesel generators being installed will increase available power-plant capacity to 7,100 kw. One of the two 1,000-kw. Worthington units on order and scheduled to go into service by Nov. 30 will bring it to 8,100 kw. The second Worthington diesel will be ready for service next February.

A Fourth Pump

Plans call for starting the fourth B-J submersible as soon as power is available. This will bring capacity to nearly 9,000 g.p.m., which should prove adequate for lowering the water below the sixth level. All pumping stations will be designed to handle 10,000 g.p.m. This is to provide a factor of safety should the flow increase beyond the present rate. When unwatering has been completed, the B-J submersible pumps will be used in a sump below the sixth level to eliminate the danger of losing standard station pumps, should the level again be flooded by a sudden inrush.

In March, 1948, when the flood occurred, the volume was estimated to be between 3,500 and 4,000 g.p.m. The difference between this and that now being pumped is the result of redrainage from porous areas adjacent to the shaft which were flooded again when the shaft was flooded. Possibly also it is due to enlargement of the new fissure cut on the sixth level, or a combination of both. Observation of the effect of continued pumping on the ground-water level in the areas adjacent to the shaft is impossible because no underground openings below the water table are available. One of the diamond-drill holes through which the ore was discovered is being reopened in order that the depth of the water table may be observed through it.

Credit for the information given is due G. W. Mitchell, manager, and W. D. Hubler, metallurgist.

ALL MUCKING in the Darwin workings is done mechanically.

New Life for Darwin Camp

WHAT'S IN THE CARDS at Darwin? Do the war-revived diggings at one of California's most famous old camps give promise of surviving? Does Anaconda Copper Mining Co. intend to remain in the California field? These questions, asked of late by mining men, were answered in an affirmative vein this past month by Frank A. Wardlaw, who manages some fifteen operating properties for Anaconda's affiliate, the International Smelting & Refining Co.

Interviewed regarding Darwin's present and future prospects in his office in Salt Lake City, Mr. Wardlaw said:

"Darwin is definitely no flash in the pan. Taken over by Anaconda on Aug. 1, 1945, it is now by far the largest lead producer in California. By current figures, annual lead production is up to nearly 18,000,000 lb.—a steady climb over previous figures. Meantime, our zinc production has been stepped up to over 12,000,000 lb. a year."

Since the first of 1948, the concentrator has been treating 275 tons of lead ore per day. Lesser tonnages of shipping ore have also been produced. When Anaconda started its work, the mill was treating 125 tons daily. Prospects for operation over a substantial period of years are considered to be good.

The Darwin diggings have a long history. First located in 1874, the Darwin Mines proved rich in surface ores which played out after 20 years. Small early smelters disappeared as poor transport facilities and ever-lowering ore grades wiped out what was once California's second largest city. In 1921 the short-lived Darwin Silver Co. tried to solve the problem. Water and power lines brought in at that time are still useful. But Darwin Silver went bankrupt after shipping some smelting ore to Utah.

The World War II demand for metals brought A. J. Theis to the old district. With lead in heavy demand, he shipped some smelting-grade lead oxides and experimented with the beneficiation of lower grades. Anaconda came on the scene with funds and geologists, studied the picture, and bought the property through Theis, who had operated as trustee for the old Darwin Mines.

At present, by working such claims as the Rip Van Winkle, Thompson, Essex, Independence, Bernon and the Defiance group, and holding claims on properties extending over a three-mile strip, Anaconda is now producing well over three-quarters of all California lead.

S. K. Droubay is manager locally. Despite Darwin's situation within sight of Death Valley, he and his men have few difficulties to contend with as to the climate. The air in the region is cooled to some degree by Mt. Whitney. The maximum temperature this past summer was reported at 105° F. A few inches of rain fall annually. Darwin draws its water from Darwin wash, four miles from the mill. Mine temperatures are low, running about 65° F. Due to the tunnels used, the mine has natural ventilation.

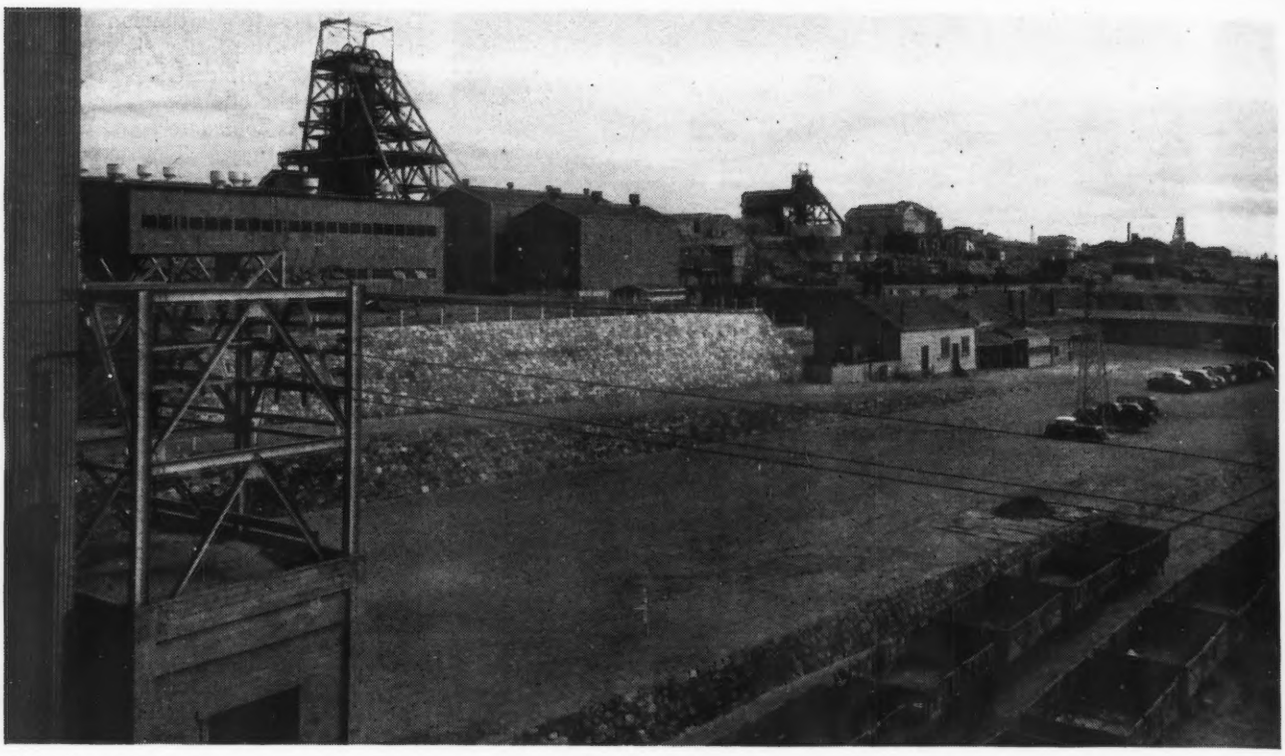
Six tunnels and adjacent workings are being utilized in the present operations. The principal opening is the Radiore tunnel, the portal of which is just above the Anaconda mill, 4,950 ft. above sea level. This is now over a mile long, having been extended about 2,400 ft. under Anaconda's management. Upper tunnels are reached both through mountain-side entries and a shaft communicating with the Radiore. Ore dropped down raises is trammed through the tunnel. Modern equipment is in use, including Little Trammer locomotives. Drifts are being driven 8 by 9 ft. with arched backs. Timber is rarely required except in the ore zones. Development headings are being driven with I-R DA 35 drills, new hydraulic jumbos being used in the faces. The metamorphosed silicified limestone at Darwin is very hard. Detachable bits are being used successfully. All mucking is done with Eimco loaders.

In the Mill

The concentrator likewise exhibits modern equipment. Power is brought in over an 18-mi. line linked with the Los Angeles municipal system. Equipment includes an 8x 6 ft. Marcy ball mill, a 20x36-in. Traylor crusher, and three four-cell Denver No. 21 Sub-A flotation machines. A 6-ft. Traylor ball mill and a 4-ft. Dorr classifier handle grinding operations. Recent mill expansion included the installation of a 300-ton receiving bin, linked by a pan conveyor to a 24x36-in. jaw crusher.

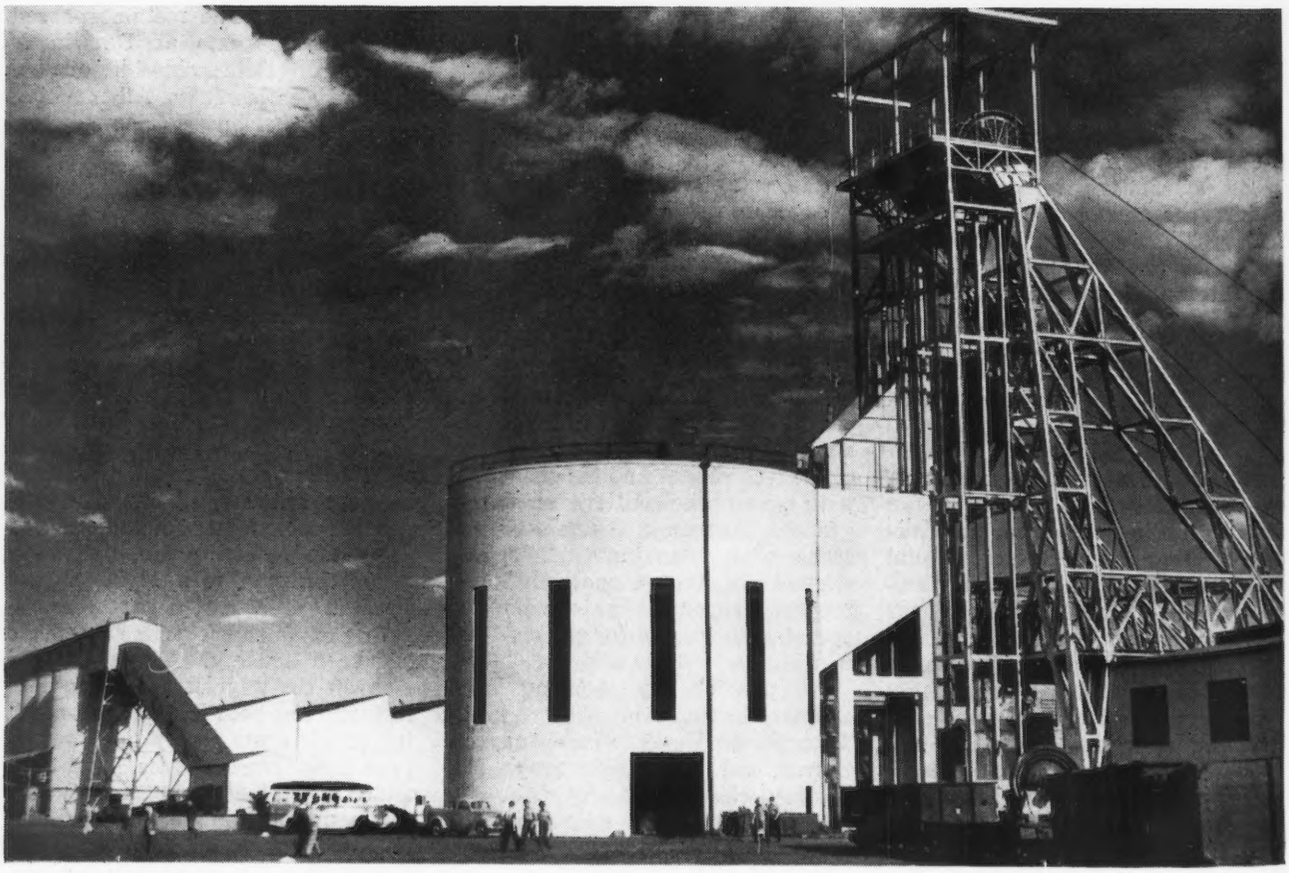
One of Darwin's prime problems has been housing. There are 125 men on the payroll. An up-to-date townsite has been laid out and much improved in the past year. Twenty-four new frame houses have been added to bunkhouses already accommodating single men. More homes for families are promised this winter. An up-to-date commissary is likewise in operation, as is a three-teacher school.

Two Mines in Australia's Premier Mineral District



NORTH BROKEN HILL, LTD. surface plant—a general view. Workshops for servicing it and the mine itself cover approximately 36,000 sq. ft. Cars in foreground are waiting to be loaded with concentrates for Port Pirie. Charles Rasp staked first claim in 1883.

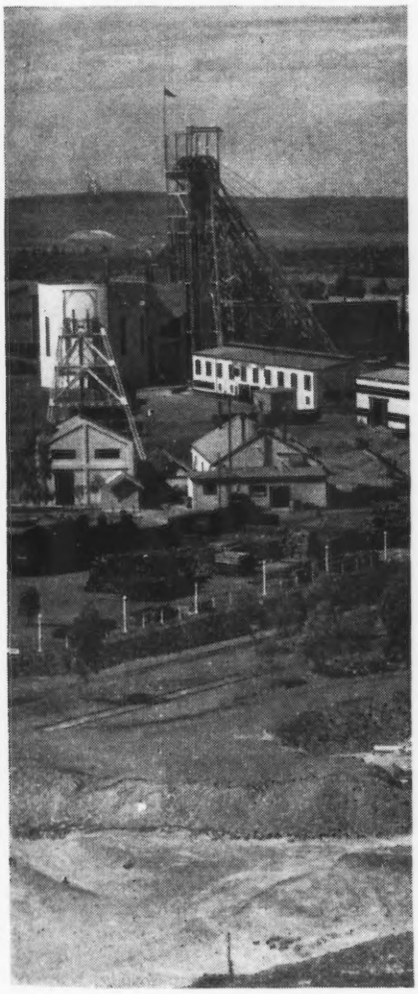
Lead-Silver Mining at Broken Hill



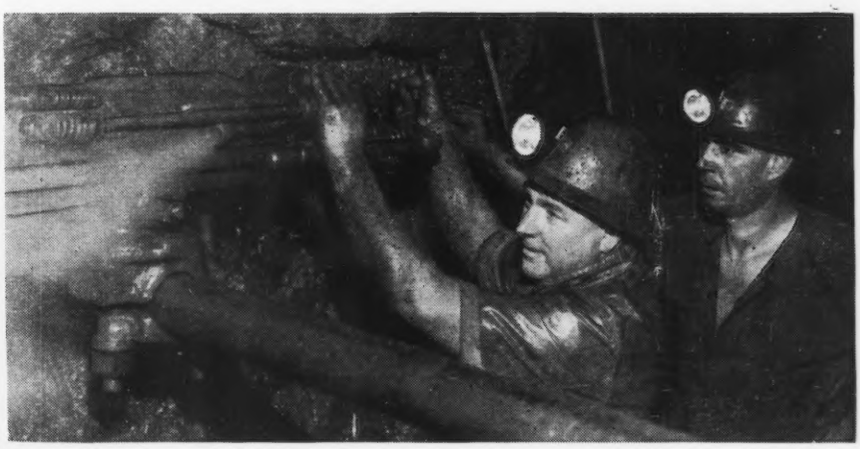
ZINC CORPORATION, LTD.'S headframe and circular ore-crushing station at Broken Hill. In the background is the mill. This mine has over 1,500 men on its payroll, produces more than 400,000 tons of lead-zinc ore yearly. In 63 years, district has yielded ore worth £230,000,000.

HEADFRAME of North Broken Hill's main shaft seen close up. The shaft is 3,027 ft. deep, has two ore-hoisting compartments.

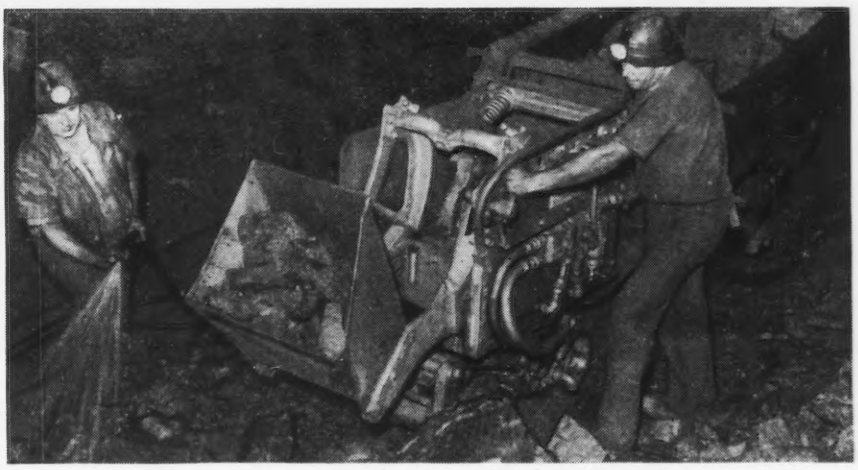
SQUARE-SET TIMBERING at Broken Hill. Sets are 6x6 ft. x 8 ft. high. Mill residues are used to fill worked-out stopes.



A DISTANT VIEW of Zinc Corporation's surface plant (see photo at left).



DRILLING from a mounting on a bar. Miners wear electric cap lamps and hard-boiled hats. They work a 35-hr. week; get base pay, plus "lead bonus," of about $60 weekly.



MECHANICAL LOADER mucking out a heading. This and other photographs by courtesy of Australian Government Trade Commissioner, New York.

NEWS OF THE INDUSTRY

Metal Miners, Engineers Discuss Practices at National Safety Congress in Chicago

Among the several thousand engineers and industrialists who met in Chicago during the week of October 17 for the 36th Annual National Safety Congress were more than 100 metal miners and mine safety engineers, comprising the Mining Section of the National Safety Council.

Meetings of the section were led by John L. Boardman, chairman of the bureau of safety of Anaconda Copper Mining Co., Butte, Mont., who has also been chairman of the Mining Section this past year.

W. R. Webb, Star Lake, N. Y., described safety practices in the open-pit mines of Jones & Laughlin Ore Co. He was joined by other iron ore operators in assigning the highest accident frequency rate to the churn drilling part of the job.

L. C. Moore, chief mechanical engineer for Cleveland Cliffs, used his records of hoisting rope life to show how better hoisting engines, better lubrication, and better materials had increased service life of ropes. Best results under the severest conditions were yielded by two galvanized ropes.

John Treweek, Homestake Mining Co., described a grinding device for reseating head sheaves to fit hoisting ropes, thereby decreasing rope wear.

L. H. Johnson, engineer for Tennessee Coal, Iron and Railroad Co., reviewed techniques for control of dust in mine air. He stated his belief that the efficacy of the aluminum therapy in preventing silicosis has yet to be proved, and that strict control of dust is the best preventive, whether aluminum is used or not. Air and water are still the most effective agents, he said.

Fred Netzeband, Keetley, Utah, pointed out the dangers of vitiated air in mine workings. Mine air can be depleted of oxygen in various ways to a point that will not support life. Oxidation of sulphide minerals can take the oxygen out of ground water, which may then seep into mine workings and, in turn, remove oxygen from the air in these openings. So-called "strata gas," he pointed out, is nothing but air badly depleted in oxygen. Masks are no protection unless they carry their own oxygen supply.

E. W. Felegy, U. S. Bureau of Mines, Salt Lake City, Utah, told about tests with low frequency radio waves in talking between surface and underground. Rods driven into the ore make the best antennae, and the waves seem to follow the orebodies. New Park Mining Co. and the Lark mine of U.S.S.R. & M. Co. are testing the method.

Several new ideas on blasting practices for metal mines were presented by F. D. Bickel, Wilmington, Del., and Frank Brogan, Holden, Wash. Mr. Bickel, who represents the du Pont company, said he had come to approve the making of a primer by inserting the cap longitudinally into the side of the cartridge and lacing the fuse back up through the cartridge. Mr. Bickel believes that electrical blasting is gradually replacing cap and fuse blasting.

In Mr. Brogan's paper, and also in general discussion, the hazards of stray currents in electrical blasting were pointed out, particularly where blasting is done in grizzly or slusher drifts with high-power cable or metallic conductors nearby. Mr. Bickel also mentioned the hazard of an electrical blasting system unprotected against lightning.

E. J. Eisenach, safety director for Climax Molydenum Co., Climax, Colo., described the methods his company uses to make scraper operations safe. These include: adequate ventilation and lighting of slusher drifts; concreting of finger raises; proper placing of scraper hoists; use of second-hand cable for slushing; thorough training of operators, and various other safeguards.

The cables used are 1⅛-in. wire ropes discarded by oil field operators. They have lost their elasticity but are still perfectly good for slushing. The point is that if one of these cables breaks under stress, it does not whip back at the operator.

All the safety measures Eisenach recounted have added up to increased production. Records show that as Climax's accident rates have gone down, its production of ore per man-shift has gone up.

Three papers covered company programs for job training to prevent accidents. J. H. Auburn, personnel director of A.S.&R., Barber, N. J., outlined the seven steps his company uses to impart safe working habits. As an illustration of one such habit, he mentioned that men breaking up slag buttons are taught that goggles, gloves, and safety shoes are just as important tools for this job as the sledgehammer.

H. J. Gemuenden, training director for Montreal Mining Co., reviewed his company's intensive and carefully planned job training program. He said the old-timer's typical attitude toward this program is "Gee, what a break this is for the new man." The basis for Montreal's program is superior training, because they have to carry most of the load in training new men and re-educating seasoned mine workers.

L. F. Bishop, production foreman, Anaconda Copper Mining Co., Butte, Mont., told how his company's training programs are aimed to improve the working environment, then improve conduct in that environment. (See pp. 91-94, E&MJ, August, 1948.)

At Butte, the accident rate per 10,000 shifts in 1936 was 9.67. In 1947, it was 3.9. In 1936, mine output averaged 5.6 tons per man shift; in 1947 it was 10.2, conclusive evidence, with that of Climax, of the gain in production through safer, more efficient operation.

Officers of the Metals Section of the National Safety Council elected for the coming year were: James K. Richardson, manager of the Utah Mining Association, chairman; Walter Montgomery, secretary of the Quebec Asbestos Producers Association, first vice president; George B. Gerry, Pickands, Mather & Co., Ironwood, Mich., second vice president; and Cliff Gibson, secretary of the Ontario Mining Association, third vice president. S. H. Ash, U. S. Bureau of Mines, Washington, D. C., continues as program chairman and secretary.

Potash Deliveries Up During Second Quarter

The American Potash Institute announced record potash deliveries during the second quarter of 1948 in North America by the five major American potash producers and two importers. The total of 517,502 tons of potash salts containing an equivalent of 278,952 tons of K_2O included European imports into the U. S. but not into Canada, and represented an increase of 9% in salts and 7% in K_2O over the tonnage delivered during the corresponding period in 1947.

Deliveries for agricultural purposes in the U. S., Canada, Cuba, Hawaii and Puerto Rico (Institute countries) amounted to 480,260 tons of salts, or 256,499 tons of K_2O; for chemical purposes, 32,770 tons of salts equivalent to 20,353 tons of K_2O.

Phelps Dodge Contracts for Ajo Smelter

Phelps Dodge Corp. has awarded to Foley Brothers, Pleasantville, N. Y., contract to erect a copper smelter at Ajo, Arizona. The plant, with an estimated capacity of 100 million lb. of copper per year, is expected to employ about 200 men and will be ample to handle all mine and mill production at Ajo.

BLS and USBM Data Show Production Trends

REMER STRONG
Assistant Editor

Trends in the production of recoverable base metals, ore and productivity of ore per man-hour in the United States are indicated by the accompanying graphs prepared from statistics released by the Technological Development Division of the Bureau of Labor Statistics. Production and labor statistics of the U. S. Bureau of Mines were also used to compile the data.

Copper

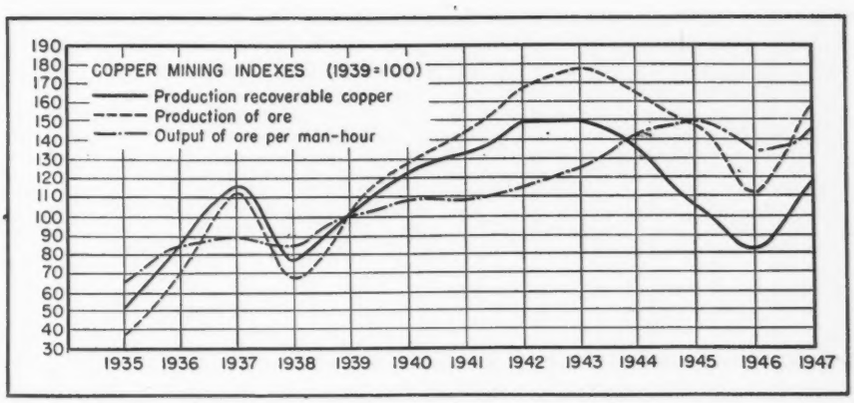
The Bureau of Mines attributed the sharp rise in mine production as well as smelter and refinery outputs from domestic ore for 1947 to several factors: improved labor-management relations, the general absence of the strikes prevalent in 1946, and continued high rate of domestic consumption. The industry enjoyed the highest price since 1918, and the over-all mine labor supply was somewhat improved during 1947.

Lead and Zinc

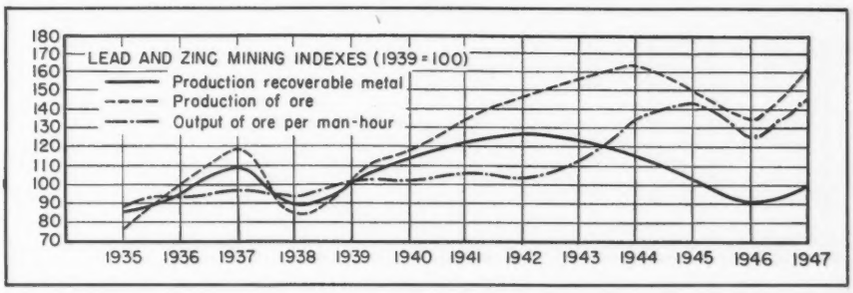
Domestic output of recoverable lead and zinc show a decided gain for last year. According to the Bureau of Mines, zinc smelters established a peacetime record for production of slab zinc, and smelter production of refined lead was up 40% from the previous year. Again, extraordinary consumer demand followed by record prices and absence of the labor and reconversion problems of 1946 were credited for the advance.

Labor Cost

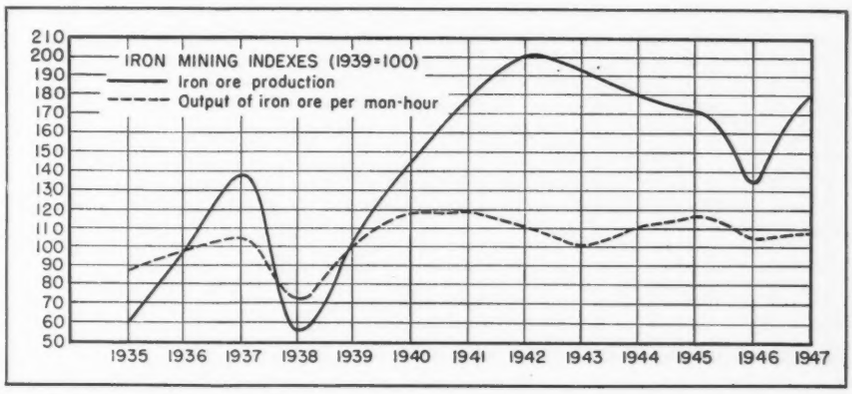
Above-mentioned price advances are further explained by the Labor Cost table. The peak costs of 1947 (in the case of lead and zinc, more than doubled since 1939) will be extended still further upward in 1948, when the fourth-round wage increases of last spring and summer are reflected in the cost index.



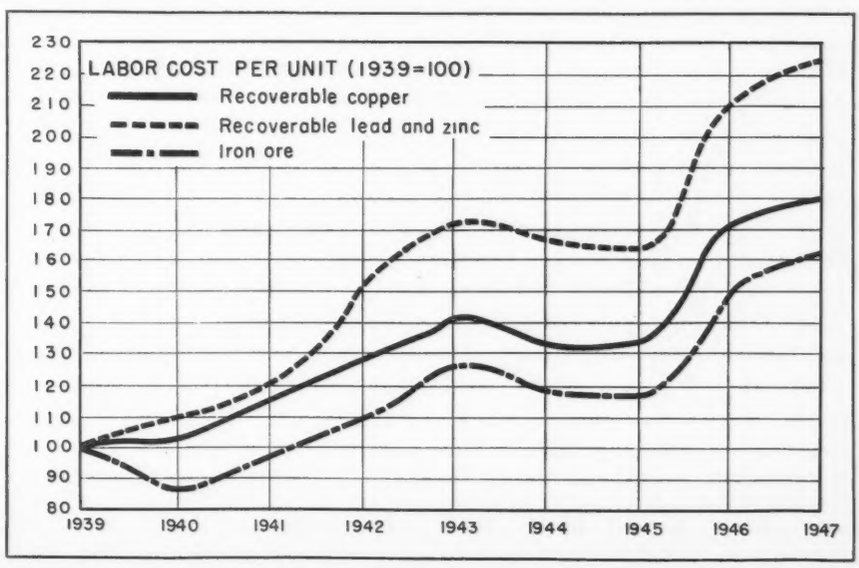
PRODUCTION INDEX based on U.S.B.M. data for recoverable copper in ore and old tailings, sold or treated, and in mine-water precipitates; 1947 figure is preliminary.[1]



PRODUCTION STATISTICS on which graph is based include the recoverable metal content of lead and zinc ores in all sections of the United States and of tailings in the Central States. The 1947 figure is preliminary.[2]



PRODUCTION INDEX is based on U.S.B.M. data for output of merchantable iron ore from open-pit and underground mines. Data by U.S.B.M. 1935-39 and B.L.S. 1939-47.



[1]Production statistics apply to mining of ore containing 2.5% or more copper, and mines with lower grades if the mines are valuable chiefly for copper. Data for labor statistics derived from U.S.B.M. data 1935-39; from B.L.S. figures for 1939-47, with the exception of 1947 ore production and output of ore per man-hour, where again U.S.B.M. figures were used to compute the indexes.

[2]Metal recovered incidentally from ores other than lead and zinc is excluded in order to make production figures comparable with labor figures. Labor statistics derived from data by W.P.A. 1935-36; U.S.B.M. 1936-39; and B.L.S. 1939-47, with the exception of 1947 ore production and output of ore per man-hour indexes, computed from U.S.B.M. figures.

HOME ON THE RANGE was rendered by (L. to R.) Oscar Johnson, Mine & Smelter Supply Co., Denver; I. W. Alcorn, Pure Oil Co., Houston; Eugene M. Thomas, Dean, College of Mines, El Paso; and Lewis E. Young, Consulting Engineer, Pittsburgh. (Photo by El Paso Herald Post.)

International Mining Days, AIME Meeting Extend True Texas Welcome to Mining Men

Combining their yearly International Mining Days celebration with a regional meeting of the AIME, the mining community of El Paso, Tex., set new records this year for quality, both of entertainment provided and of technical matters discussed. Meeting in the Gateway City from Oct. 24 to 28, over 600 mining men and their families from all over the United States, Canada and Mexico heard an excellent technical program which included the proceedings of the newly-formed Minerals Beneficiation Division of the Institute.

The most memorable feature, however, was the El Paso mining equipment suppliers' party over in the Juarez beer garden, across the border, where visitors sampled *tacos* and *tamales*, burning their lips on *calapena peppers*, and singing off-key choruses of *La Cucaracha*.

Memorable, too, was the closing banquet at the Country Club. This was the dinner where Dr. Wrather and Jack Myers, at close range, failed to discover that the guest speaker, Countess Maria Pulaski, famous Polish woman spy, was in truth neither countess nor spy.

Anyone who has ever wanted to mix Scotch whisky with his orange juice, oatmeal and scrambled eggs (before eating them) had the opportunity to do so at the Minerals Beneficiation Division's Scotch breakfast. Invented by Walter Maxson, this barbaric rite has become MBD tradition in one year. It is not followed by a technical session.

Less Gaelic but even livelier was the breakfast given one morning by the El Paso Rancheros Club, who got everybody up by 7 a. m. to eat scrambled eggs (straight), prunes, bacon and biscuits. With Oscar Johnson as tenor, L. E. Young as bass and I. W. Alcorn and Eugene M. Thomas filling in, a scratch quartette misted many an eye with its rendering of "Home on the Range."

Getting down to business, the visitors heard Charles White Merrill, U. S. Bureau of Mines, predict, in a paper read by A. J. Martin, that the military stockpiling program will probably "act as an insatiable sponge in absorbing all copper, lead, and zinc outputs above current normal demand for some years to come."

Geology, mining, and processing of potash salts in the Carlsbad area of New Mexico were reviewed by G. T. Harley, Russell Hayworth and W. P. Wilson, respectively. Fred D. Gustafson, in discussing production of perlite, pointed out the rapid growth in demand for lightweight concrete aggregates (2 to 16 lb. per cu. ft.), and told of certain problems that arise in mining and processing perlite for that purpose. He felt that profitable local markets for such aggregates make possible great expansion of this industry.

Another non-metallic getting increased attention is pumice. Most of the United States' supplies have come from Italy. Jack Pierce told about development of New Mexican pumice, and Don Clippinger reviewed the status of New Mexico's non-metallic mining industry in general.

Dump leaching, as practised at Kennecott's Chino mine, Hurley, N. M., is unusual in three respects according to A. P. Morris, assistant mine superintendent. The ore contains chalcocite, not often encountered in other leaching operations; mill tailing water is used for leaching; pregnant solution is recirculated through the dump to get complete dissolution of chalcocite.

E. A. Slover, Hurley smelter superintendent, described the system of refining used at his plant, and Harrison Schmitt, geologist from Silver City, N. M., prepared a paper on classification of ore deposits for field engineers. The latter involved considerable analysis and will deserve more study than could be given at one hearing.

The adaptability to varying conditions required of the mining and the stope-filling methods at Eagle-Picher's San Xavier mine was related by C. W. Irwin.

In a special session for young engineers Walter Maxson, I. M. LeBaron, R. J. Mellen and J. B. Cunningham gave advice on the proper attitude of a recent graduate toward his new job. They told the 43 young men present that mining management's interest in them is keen, as evidenced by an increasing number of company training programs and a gradual improvement in opportunities for young men. They emphasized, however, that a young man who feels that the industry owes him a living is as unwanted as ever.

Operating in separate sessions, the Minerals Beneficiation Division got off to a fast start with a paper by Harlow Hardinge and R. C. Ferguson, describing the economy in ball wear and power consumption of running a ball mill at slow speeds. Their calculations show that the savings of slow speeds would outweigh the extra expense of buying a larger mill, if one wanted to gain the increased capacity possible through speeding up the smaller mill.

On the other hand, J. F. Myers, MBD chairman, reported on tests at Tennessee Copper Co. which showed that fine-crushing rod mills do work in direct proportion to their rotating speeds. His rod mills are now running at 85% of critical speed. The ensuing discussion showed considerable difference of opinion on how rod mills ought to be, or even could be, run.

E. H. Rose told of speeding up the rod mills at International Nickel's Copper Cliff mill to get increased tonnage. Later, he said, the grinding circuit was changed to use half the rod mills as fine crushers and half as ball mills. Capacity stayed the same, but efficiency increased and costs decreased.

Stuart Falconer prepared an impressive review of the literature on conditioning of mineral surfaces prior to flotation. The importance of time and temperature in conditioning was brought out by Curtis of Miami Copper, and Cook, University of Utah. Professor Cook started a lively discussion by describing his new technique for floating fluorspar cleanly. Boiling the pulp, or at least heating strongly, is required. The reagents, oleic acid for example, can be added dry to the dry ore, which is then ground dry. Heat is the essential component.

Messrs. Myers, McLachlan and Pearse, all operators of deep cells, discussed the reactions that occur in the

depths of their cells. Where pyrrhotite is present, the extra retention time in a deep cell seems important. McLachlan mentioned that aeration at Noranda gave the desired results only if done at depth. No one suggested that perhaps these functions of conditioning, aeration, and flotation might be better done if done separately.

Flotation theory got a working-over in one session, where the chief complaint seemed to be, as was pointed out in this magazine two years ago, that most theorists are drawing steadily away from the operators who must eventually put their theories to work.

Professor M. A. Cook, of Utah, crawled through several loopholes in the flotation theories of Wark, Gaudin and Taggart and brought out a new theory which presumes that molecules, rather than ions, form the hydrophobic coatings that make minerals float. The resulting discussion indicated that Professor Cook has some strong points, but faces a long job in proving them.

W. A. Wasley, R. J. Mellen, F. C. Green and others contributed to a general discussion of milling problems in the Southwest. Norman Weiss told of the fine-ore bins at Santa Barbara, which had eight sections in each bin to cut down segregation of fine and coarse ore. Cananea now uses cones ahead of the rougher concentrate thickeners, the cone underflow going right to regrind. This eases the load on the thickeners and makes each shift treat its own middlings.

R. J. Benson, chairman, and J. E. Despins, secretary-treasurer, of the El Paso Metals Section of the AIME, handled the Institute side of the meeting, assisted by committees headed by L. G. Hetrick, Homer C. Hirsch, R. S. Beard, E. M. Thomas, A. F. Horle and T. J. Woodside.

The El Paso Chamber of Commerce, which sponsors International Mining Days, was represented by Chris P. Fox, executive vice president and W. J. Garard, industrial secretary. E. McL. Tittman was chairman for the celebration, assisted by committees headed by J. E. Despins, E. Flanagan, Gus Momsen, R. S. Beard, W. R. Blair and Al Washburn.

Alcoa Will Purchase Massena Plant

The Aluminum Company of America has agreed to purchase the Government-owned aluminum plant at Massena, N. Y., for $5 million, the War Assets Administration announced Nov. 5. As part of the deal, the company will make available to the aluminum industry of this country all of its alloy patents and important rights involving processing and fabrication without any reciprocal obligations.

Jess Larson, War Assets Administrator, said the agreement provides for the sale of certain carbon-producing equipment from the Government's Burlington, N. J., plant for $175,000. This transaction will permit Alcoa to advance the opening of its new aluminum smelter at Port Comfort, Texas, by several months and relieve the existing aluminum shortage. WAA, on the other hand, has agreed to purchase from Alcoa for $115,000 a license involving all of the company's machine patents applicable to the aluminum producing facilities constructed by Alcoa for the Government during the war period.

It was revealed that Alcoa's overall production will be increased only moderately as a result of the deal, for it intends to transfer smelting capacity from its own facilities at Massena to the new plant. However, it has agreed to maintain in standby condition for national emergency purposes aluminum capacity equal to that shut down. The company plans to spend $2,750,000 in placing the newly acquired plant in operation.

Donora Plant Reopened After Smog Inquiry

The American Steel & Wire Co. announced that its zinc smelter at Donora, Pa., would reopen on Nov. 8, as there was no evidence of any kind which would incriminate any one mill as a source of harmful atmospheric contamination. The plant was closed Oct. 31 pending an investigation by federal and state authorities into the smog that enveloped the Donora area and caused the death of 19 persons.

Health authorities are conducting a study covering all industries in the area to determine what materials are used in manufacturing operations and what gases are sent into the air. Samples of the atmosphere are being taken under varying conditions to insure against a recurrence of the smog.

Lead Workers Election Brings "No Union" Vote

Production at the St. Joseph Lead Co. was reported back to normal in October, with 3,400 employees working without union representation. The National Labor Relations Board election ended in a "No Union" vote by employees. The smelter workers had gone on strike in July but began a return-to-work movement in September at the instigation of the Ozark Lead Workers Association, an independent employee organization.

In a preliminary voting on Sept. 27 to determine a bargaining agent, the Ozark Lead Workers was eliminated from the ballot, leaving the run-off between the CIO Gas, Coke and Chemical Workers and "No Union." Mine, Mill and Smelter Workers Local 648, original bargaining agent for the workers which was removed from the ballot because of the Communist issue, had campaigned for the "No Union" vote.

Strike at Bingham Closes Kennecott Mine

A strike called by the Brotherhood of Locomotive Firemen and Enginemen which paralyzed the huge Kennecott Copper Corp. operations at Bingham, Magna and Arthur, Utah, beginning Oct. 24 was still in effect in November.

Involving 311 engineers and firemen operating ore trains within the company's open-cut mine operations—and 4,200 other company employees—the strike originally was scheduled for Oct. 15. This was postponed at the request of Cyrus Ching, director, Federal Mediation and Conciliation Service.

Three federal mediators and Dan Edwards, chairman, State Labor Relations Board, met with both parties at intervals until Oct. 22, when the negotiations broke down a second time. Picketing when the strike began Oct. 24 was perfunctory but effective.

S. C. Phillips, Cleveland, BLFE president, said his brotherhood sought $4.08 daily "adjustment" for each of the 311 members employed at the mine, to bring their wages to parity with other members of the union employed on the Bingham-Magna-Arthur ore-hauling line.

Roy Hatch, company director of labor relations, said the brotherhood demand "is unreasonable on the face of it." A third-round wage increase of 96c. a day was received by all other employees of the division effective July 1 and this increase has been offered to the brotherhood. He said the union demand is 208% more than the average increase received by all other 4,200 employees. Wages of other workers are tied to those paid the enginemen.

Negotiations were transferred to Washington, D. C., Nov. 5 at the invitation of the Federal Mediation Service. The service recommended Nov. 6 that the dispute be turned over to a fact-finding board to hear arguments from both union representatives and the company. Union officials agreed to the proposal but the company rejected it. In Salt Lake City, D. D. Moffat, company vice president and general manager, stated the issue had been studied thoroughly during past weeks and in Washington, D. C. Another fact-finding board, he said, would result in a "waste of time."

Operations of three other companies, meanwhile, have been curtailed seriously. These are the American Smelting & Refining Co. smelter at Garfield, which treats the Kennecott concentrates; Hercules Powder Co., one-fourth of whose local production is used by Kennecott, and the Simplot Fertilizer Co., which uses acid supplied from the Kennecott operations.

MARKETS—Trends and Prices

Tight Supply in Major Non-Ferrous Metals Continues—Zinc Price Raised to 17½c.—Foreign Silver Lower

NOVEMBER BROUGHT NO RELIEF from the tight supply situation of recent months in major non-ferrous metals. In fact, a dock strike on the East Coast, settled late in the month, added to the difficulties. The strike of dock workers on the Pacific Coast was in process of settlement as November ended. Along with the transportation difficulties, the industry struggled with the Government's stockpile demands for copper, lead and zinc. Strikes at Kennecott's Utah mine and at several plants of the American Zinc, Lead & Smelting Co. continued, and there were no indications of when these work stoppages would end.

Excepting silver, price changes were upward. Prime Western zinc advanced to 17½c. per pound, East St. Louis, up 2c. from the previous mark. Cadmium was raised 10c. per pound, to the basis of $2 per pound on regular commercial sticks. Quicksilver strengthened on reduced pressure from abroad and falling output here. The New York Official quotation for silver was weak because of larger receipts and a reduced demand from silversmiths and jewelers, resulting in a loss of 4¾c. an ounce for the month. The E&MJ index of non-ferrous metal prices advanced from 179.58 in October to 185.26 in November, a new high for the postwar period. In November a year ago the index stood at 151.92.

Copper Sellers Nervous

Call for copper from consumers continued in excess of the supply, and, as the month ended, speculation was widespread on whether the price could be maintained at 23½c., Connecticut Valley, much longer. Some traders argued that with the important Utah mine down because of the strike of railroad engineers and firemen, the resultant deficit in output here could not be offset by increased production elsewhere in this country or through larger imports. Consumers, in some instances, were willing to protect themselves by paying a premium over the going market price for outside lots. Scrap copper advanced to higher levels than the 23½c. basis would warrant. In spite of the tight market, the record shows that consumers obtained close to 100,000 tons of copper for November shipment, all on the basis of 23½c. per pound, price on date of shipment, or the monthly average.

Foreign demands for copper also were large, but business was more or less restricted in the export field because of the uncertain price situation here. The price realized abroad was unchanged throughout November at the equivalent of 23½c., f.a.s. New York.

Mine production of recoverable copper in the United States in September, the latest figures available, amounted to 69,808 tons, of which Utah alone supplied 22,915 tons. Output in August came to 73,523 tons, and the monthly average for all of 1947 was 70,630 tons, according to the Bureau of Mines.

Lead Firm at 21½c., N. Y.

The advance in the price of lead that occurred on Nov. 1 was not only maintained but appeared to be quite firm. Foreign metal obtained from countries that normally do not ship their product into the United States continued to sell at a premium. Domestic production is gradually moving up to the level that prevailed earlier in the year, and imports have been substantial. It is still too soon to determine whether the 21½c. level will augment the domestic supply and finally bring about a more orderly market. Consumers remained greatly concerned over the outlook, particularly in view of the demands on producers and importers to set aside approximately 7,000 tons a month over the next seven months for the stockpile. The Government's demands, some observers feared, might set off another price advance. At a meeting in Washington called in connection with the stockpile program it was decided that the lead could be obtained by negotiating on an individual company basis.

Domestic production and imports of refined lead, by months, in tons:

	Production, Refined	Imports, Refined
January	50,821	13,742
February	43,598	15,931
March	50,093	17,052
April	49,652	14,746
May	50,626	17,754
June	47,227	11,145
July	40,458	23,969
August	29,558	21,111
September	37,105	28,504
October	46,787	(a)
Total	445,925	.....

(a) Not yet available

Zinc Advanced Sharply

An increase in wages of smelter workers in the Tri-State area of 13½c. an hour caused the Eagle-Picher Mining & Smelting Co. to raise its selling basis for Prime Western zinc to 17½c., East St. Louis, 2c. per pound higher than the previous quotation. News of the advance did not reach New York until late on Nov. 12, after metal had already been sold at the old figure of 15½c. Our weighted average on sales made on Nov. 12 was 17.075c. per pound. On the following day all offerings at the lower level were withdrawn and the market became firmly established at 17½c. The move was far from popular with producers. Consumers continued to purchase the metal freely at the higher level.

The October statistics of the American Zinc Institute placed output of slab zinc in this country at 70,716 tons, against 64,721 tons in September. Shipments for the month totaled 67,402 tons, of which 61,751 tons was moved on domestic account, 2,603 tons went for export, and 3,048 tons was consigned to the Government. Stocks at the end of October totaled 44,431 tons, against 41,117 tons a month pre-

Lead Production by Countries

(American Bureau of Metal Statistics)

The following accounting is essentially on the basis of primary refineries and includes both soft and hard lead. Production in the United States includes derivation from imported ore and base bullion and some scrap. Figures in short tons.

	May	June	July	Aug.	Sept.	Oct.
United States	50,626	47,227	40,458	29,558	37,105	46,787
Canada	13,081	11,356	9,314	12,010	15,900	17,747
Mexico	13,062	15,640	16,657	20,503	14,411	20,048
Argentina	2,143	1,434	2,658	1,781	....	....
Peru	2,836	2,902	3,493	3,501	2,260	2,868
Belgium	6,247	6,430	6,001	6,835	....	....
France	3,095	3,966	2,183	4,138	5,147	....
Germany (Br. zone)	2,537	3,322	4,038	6,196	....	....
Italy	2,368	3,767	2,019	884	....	....
Poland	1,544	1,605	....	....	....	....
Spain	4,151	1,312	1,343	1,327	2,216	....
Japan	948	752	1,039	989	....	....
Australia (a)	16,712	17,069	19,247	19,680	19,096	....
Tunis	3,117	37	62	2,130	2,756	....
Rhodesia	1,366	1,176	1,215	1,215	1,176	1,266
Totals	123,833	117,995	....	....	....	....

(a) The production credited to Australia includes lead refined in England from Australian base bullion.

vious. Stocks of zinc, as well as copper and lead, are still abnormally low.

Zinc concentrate in the Tri-State market advanced to $110 per ton, effective Nov. 15, following the rise in the price of the metal. Miners in the district accepted a wage increase of 12½c. an hour.

Cadmium was advanced 10c. per pound on Nov. 15, establishing the quotation at $2 per pound for commercial sticks and at $2.10 per pound for patented shapes sold to platers. The metal has been in a strong position all along, with output below requirements.

Imports of silver have been fairly heavy of late, particularly in the form of Mexican pesos for remelting. Demands of jewelers and silversmiths have been on a reduced scale, and selling pressure developed, causing the New York market to sell off to 70c. an ounce.

Quicksilver was firmer on what was described as a more orderly selling program by the Cartel. Most of the unsold metal now in this country appeared to be in strong hands and little was to be had except at replacement costs. A rumor to the effect that the European sellers intend to raise the price $2 per flask also was a market factor. As the month ended the market rested somewhere between $78 and $79 per flask, round lots.

Platinum was about steady, leading interests holding the price at $93 an ounce troy. Demand from the jewelry trade was disappointing.

Major Metals

U. S. DAILY AND AVERAGE PRICES

1948 Nov.	Electrolytic Copper (a) Domestic	(b) Export	Straits Tin New York	Lead New York	Lead St. Louis	Zinc East St. Louis
1	23.200	23.425	103.000	21.500	21.300	15.500
2	Holiday	23.425	Holiday	Holiday	Holiday	Holiday
3	23.200	23.425	103.000	21.500	21.300	15.500
4	23.200	23.425	103.000	21.500	21.300	15.500
5	23.200	23.425	103.000	21.500	21.300	15.500
6	No Market	23.425	103.000	21.500	21.300	15.500
8	23.200	23.425	103.000	21.500	21.300	15.500
9	23.200	23.425	103.000	21.500	21.300	15.500
10	23.200	23.425	103.000	21.500	21.300	15.500
11	Holiday	23.425	Holiday	Holiday	Holiday	Holiday
12	23.200	23.425	103.000	21.500	21.300	17.075
13	No Market	23.425	103.000	21.500	21.300	17.500
15	23.200	23.425	103.000	21.500	21.300	17.500
16	23.200	23.425	103.000	21.500	21.300	17.500
17	23.200	23.425	103.000	21.500	21.300	17.500
18	23.200	23.425	103.000	21.500	21.300	17.500
19	23.200	23.425	103.000	21.500	21.300	17.500
20	No Market	23.425	103.000	21.500	21.300	17.500
22	23.200	23.425	103.000	21.500	21.300	17.500
23	23.200	23.425	103.000	21.500	21.300	17.500
24	23.200	23.425	103.000	21.500	21.300	17.500
25	Holiday	23.425	Holiday	Holiday	Holiday	Holiday
26	23.200	23.425	103.000	21.500	21.300	17.500
27	No Market	23.425	103.000	21.500	21.300	17.500
29	23.200	23.425	103.000	21.500	21.300	17.500
30	23.200	23.425	103.000	21.500	21.300	17.500
AVERAGES FOR MONTH						
Nov.	23.200	23.425	103.000	21.500	21.300	16.786
AVERAGES FOR WEEK						
Nov.						
3	23.200	23.425	103.000	20.300	20.100	15.500
10	23.200	23.425	103.000	21.500	21.300	15.500
17	23.200	23.425	103.000	21.500	21.300	17.415
24	23.200	23.425	103.000	21.500	21.300	17.500
CALENDAR WEEK AVERAGES						
Nov.						
6	23.200	23.425	103.000	21.500	21.300	15.500
13	23.200	23.425	103.000	21.500	21.300	16.215
20	23.200	23.425	103.000	21.500	21.300	17.500
27	23.200	23.425	103.000	21.500	21.300	17.500

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

1948 Nov.	Sterling Exchange "Checks"	Silver (c) New York	Silver London	Gold London	Gold (d) United States
1	402.750	74.750	45.500d.	172s. 3d.	$35.00
2	Holiday	Holiday	45.500d.	172s. 3d.	Holiday
3	402.750	74.750	45.500d.	172s. 3d.	35.00
4	402.750	74.750	45.500d.	172s. 3d.	35.00
5	402.750	74.750	45.500d.	172s. 3d.	35.00
6	(e)	(e)	(e)	(e)	35.00
8	402.750	74.250	45.500d.	172s. 3d.	35.00
9	402.750	74.250	45.000d.	172s. 3d.	35.00
10	402.750	74.250	45.000d.	172s. 3d.	35.00
11	Holiday	Holiday	45.000d.	172s. 3d.	Holiday
12	402.750	74.250	45.000d.	172s. 3d.	35.00
13	(e)	(e)	(e)	(e)	35.00
15	402.750	74.250	45.000d.	172s. 3d.	35.00
16	402.750	74.250	45.000d.	172s. 3d.	35.00
17	402.750	74.250	45.000d.	172s. 3d.	35.00
18	402.750	74.250	45.000d.	172s. 3d.	35.00
19	402.750	73.750	45.000d.	172s. 3d.	35.00
20	(e)	(e)	(e)	(e)	35.00
22	402.750	73.750	45.000d.	172s. 3d.	35.00
23	402.750	73.750	45.000d.	172s. 3d.	35.00
24	402.750	72.250	45.000d.	172s. 3d.	35.00
25	Holiday	Holiday	45.000d.	172s. 3d.	Holiday
26	402.750	71.250	45.000d.	172s. 3d.	35.00
27	(e)	(e)	(e)	(e)	35.00
29	402.750	70.000	45.000d.	172s. 3d.	35.00
30	402.750	70.000	42.500d.	172s. 3d.	35.00
AVERAGES FOR MONTH					
Nov.	402.750	73.566	45.023	—	35.00
AVERAGES FOR WEEK					
Nov.					
3	402.750	75.125	—	—	
10	402.750	74.450	—	—	
17	402.750	74.250	—	—	
24	402.750	73.550	—	—	

Calendar week averages, New York Silver: Nov. 6th, 74.750; 13th, 74.250; 20th, 74.150; 27th 72.750.

(e) Not quoted (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300c. per pound, the average differential for delivery charges.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075c. for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c. to 0.15c. per pound.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for the Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month; the premium on Special High Grade in most instances is 1¼c.

Quotations for lead are for common lead. Corroding lead commands a premium of 10 points.

(c) The daily New York silver quotation reported by Handy & Harman is for silver contained in ores and other unrefined silver-bearing materials, in cents and one-eighth cent fractions per troy ounce. It is determined by Handy & Harman on the basis of actual sales of bar silver .999 fine in amounts of 50,000 ounces or more for nearby delivery at New York, and is usually one-quarter cent below the price paid for such bar silver, this deduction being the allowance for carrying, delivering, and marketing. In addition to foreign silver, the quotations also apply to domestic and Treasury silver if such silver enters into the New York market.

The Treasury's purchase price of newly mined domestic silver 90.5c. per troy ounce 1000 fine, effective July 1, 1946. London silver in pence per troy ounce, basis .999 fine.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

Markets—Trends and Prices

Miscellaneous Metals

(Monthly Averages)

Average prices of miscellaneous metals for October and November:

	Oct.	Nov.
Quicksilver, N. Y., flask	76.000	77.913
Antimony (a)	40.830	41.670
Antimony, bulk, Laredo	37.660	38.500
Antimony, in cases, Laredo	38.160	39.000
Antimony, Chinese (b)	.....	.....
Platinum, oz. troy	93.000	93.000
Cadmium (c)	190.000	195.652
Cadmium (d)	195.000	200.652
Cadmium (e)	200.000	205.652
Aluminum, ingot	16.680	17.000
Magnesium, ingot	20.500	20.500

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

E. & M. J. Weighted Index of Non-Ferrous Metal Prices

(100 is composite for 1922-3-4. Copper, Lead, Zinc, Tin, Silver, Nickel, Aluminum)

1938	73.67	1943	88.74
1939	77.71	1944	88.74
1940	79.22	1945	90.86
1941	83.49	1946	110.06
1942	86.80	1947	149.46

	1946	1947	1948
January	96.42	140.88	154.20
February	96.42	140.42	155.63
March	96.42	150.71	155.63
April	96.42	153.14	160.67
May	96.42	154.03	161.33
June	107.16	150.05	162.30
July	117.11	148.73	164.55
August	113.32	149.35	177.68
September	113.32	150.80	178.26
October	114.25	151.05	179.58
November	131.23	151.92	185.26
December	142.19	152.48	....

Official London Prices

Since Dec. 18, 1939, the British Ministry of Supply has named maximum delivered prices for the major non-ferrous metals. Delivered prices for consumers in the United Kingdom effective Dec. 1, 1948, follow:

Per Long Ton	£	s.	d.
COPPER:			
Electrolytic, high conductivity	140	0	0
Fire refined, high conductivity	140	0	0
Fire refined, high grade	139	10	0
Fire refined, min. 99.2 percent	139	0	0
Fire refined, min. 99.7	138	10	0
Hot rolled black wire rods	146	0	0
LEAD:			
Soft, foreign, duty paid	112	0	0
Soft, Empire	112	0	0
English refined	113	10	0
ZINC:			
Foreign (G.o.b.), duty paid	106	0	0
Domestic (G.o.b.)	106	0	0
Prime Western and debased	106	0	0
Refined and electrolytic	106	15	0
Minimum 99.99 percent	108	5	0
TIN:			
Ingot, 99 percent	569	0	0

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York unless otherwise stated

MISCELLANEOUS METALS

(Nov. 30, 1948)

Aluminum, ingot, 99 plus percent, lb. (base price)	17c.
Antimony, spot, lb., 5 tons and up but less than carload, in cases	41.67c.
Bismuth, ton lots, lb.	$2.00
Cadmium, commercial sticks, lb.	$2.00
Calcium, lb., ton lots, 98 percent, cast	$1.95
Chromium, 97 percent grade, lb., spot	$1.02
Cobalt, 97 to 99 percent, per lb.	$1.65
Indium, troy oz.	$2.25
Nickel, electrolytic cathodes, lb., f.o.b. Port Colborne (a)	40c.
Magnesium, 99.8 percent, carloads, lb., producer's plant	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation wholesale lots), troy oz.	$93.00
Quicksilver, flask of 76 lbs., 25 flasks or more	$78.00
Selenium, 99.5 percent, lb.	$2.00
Silicon, minimum 97 percent, spot, carloads, lb.	16.50c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$15.00
Titanium, 96 to 98 percent, lb.	$5.00@$6.00

(a) Includes U. S. duty.

METALLIC ORES

Beryllium Ore, 10 to 12% BeO, f.o.b. mine, per unit	$24.00@$26.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry	
48% Cr_2O_3, 2.8 to 1 ratio	$34.00@$35.00
48% Cr_2O_3, 3 to 1 ratio	$38.00@$41.50
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$6.60
Mesabi bessemer	$6.35
Old Range non-bessemer	$6.45
Mesabi, non-bessemer	$6.20
Lead (Galena), 80 percent, Joplin, Mo., ton	$292.17
Manganese Ore—Per long ton unit of Mn. basis 48 percent manganese, subject to premiums and penalties, f.o.b. cars Atlantic and Gulf ports, duty paid, 70.6@72.6c Prices nominal.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tantalite, 60% concentrate, per lb.	$2.00@$2.75
Tungsten Ore, per unit of WO_3:	
Foreign, 60 percent, duty paid	$24.25@$24.75
Domestic, scheelite, 60 percent and upward	$28.50
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	27½c.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$110.00

METALLIC COMPOUNDS

Arsenious Oxide (arsenic trioxide) lb., in bbl., carload lots, delivered	6¼c.
Cobalt Oxide, 70 to 71 percent, lb., ceramic grade	$1.27@$1.30
Copper Sulphate, 100 lb.	$8.10

ALLOYS

Beryllium Copper, 4 percent Be, per lb. of contained Be	$20.50
Ferrochrome, 65 to 69 percent, per lb. of Cr contained	18.60c.
Ferromanganese, 78 to 82 percent, gross ton, seaboard	$160.00
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo, contained	95c.
Ferrosilicon, 50 percent, per lb. of contained Si	10.5c.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$2.25
Ferrovanadium, per lb. of V delivered	$2.90
Silicomanganese, 1½ percent C, per lb. contracts	8.6c.
Spiegeleisen, per long ton, 19@21%	$62.00

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U. S. funds), ton:	
Crude No. 1	$896@$960
Crude No. 2	$350@$545
Spinning fibers	$204@$378
Paper stock	$51@$78
Shorts	$24@$46
Vermont, f.o.b. Hyde Park:	
Shingle stock	$97.00@$107.00
Paper stock	$68.50@$85.00
Waste	$51.00
Refuse or shorts	$25.50@$46.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$11.50@$12.00
Missouri, 93 to 94 percent $BaSO_4$, per short ton	$9.00@$9.50
Bauxite, long ton:	
Domestic, crude, 50 to 52 percent (not dried)	$4.00@$5.00
Domestic, chemical, 55 to 58 percent	(a)$8.50@$9.00
Domestic, abrasive, 80 to 84 percent	$17.50@$18.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, airfloated, bulk	$8.00@$9.00
North Carolina, ceramic grade	$18@$22
Feldspar, bulk ton:	
Potash or soda feldspar, 200 mesh	$18.50
Glass spar, white, 20 mesh	$11.75@$12.50
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois, 70 percent, all rail movement, ton	$37.00
Acid 97% concentrate, bulk, ton	$44.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b., bulk, Washington	$31
Mica — Domestic f.o.b. mines. Punch, 12 to 18c. per lb. according to size and quality. Sheet, clear, 1½ x 2 inch, 70 to 75c.; 2 to 2 inch, $1.10 to $1.20; 2 x 3 inch, $1.50; 3 x 3 inch, $1.80; 3 x 4 inch, $2.25; 3 x 5 inch, $2.75; 4 x 6 inch, $3.50; 6 x 8 inch, $4 to $6. Wet ground, very fine, $135@$175 per ton. Bulk sales, dry ground, $40@$80 per ton. Scrap, $25 and up.	
Ocher, Georgia, ton, in sacks	$24.00
Pyrites, Spanish, per long ton unit of S, cif. Atlantic ports	(a)12@14c.
Sulphur, Texas, mines, long ton	$16.00@$18.00
Talc, f.o.b. works, ton:	
New York, purified	$18.50@$20.00
Vermont, extra white	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

(a) Nominal.

IRON AND STEEL

Pig iron, Valley furnaces, gross ton: Basic	$46.00
Steel, f.o.b., Pittsburgh billets, net ton	$59.00
Structural shapes, 100 lb.	$3.25

WASHINGTON REFLECTIONS

McGraw-Hill Washington News Bureau

THE FOLLOWING IS an appraisal of what can happen under the new Truman Administration and the "partisan" Congress. It is too early to call the turn of national legislation accurately, but there are a number of basic items that can safely be outlined.

Truman to Push Liberal Legislative Program

At the outset, the President's program will probably be a warmed-over version of the major items he has asked Congress for since Sept., 1945.

Reason for this is obvious. Government departments had not been doing any planning about next year, they thought it would be wasted effort. Now they have a memorandum from the President which asks them to come up with their ideas for legislation. They are to present their ideas to budget director James Webb, along with a time-table on how near ready the proposals are for presentation, documentation and insertion into the legislative hopper.

Thus, the State of the Union message is expected to follow the same path broken through the ice of the last two years. Topics here are: increased minimum wage, expanded social security, aid to education, resources development and perhaps his old cry, "standby controls to harness inflation." Whether or not controls over scarce materials come up in his opening address, they will be up and probably passed in some form during the spring session.

At the start of the next legislative year, at least, relations between the President and his Democratic Congress are going to be amicable. There is a "Gentleman's Agreement" underway between the Old Line Democrats and the Southerners who bolted the party over the States Rights issue. Senator-elect Russell Long, son of the famous Huey, says that Southerners are in the mood to come back to the party. So, if the Democratic hierarchy does not try to ram civil rights down the Dixiecrats' throats on Jan. 20, Truman will have a strong following in Congress.

Congress Democratic; Plans Balanced Budget

After Jan. 20, the 81st Congress will be strongly Democratic. Democrats, in the election, picked up 77 Republican districts, all in the North, Midwest, Mountain States and Far West. Net gain, 75 seats, making the division of the House 263 Democrats, 1 American Labor Party, and 171 Republicans. Of the 435 House members in the "worst" 80th Congress, 130 won't be back. In the Senate, Democrats gained 9 seats, to give them a majority of 54 to 42.

This will be the most New Deal-minded Congress since 1936. Every new Senator is New Dealish, replacing the Republican old-guard. In addition, President Truman has friends in the right places—O'Mahoney presiding over the Senate interior and insular affairs, and probably the Joint Economic Committee; Missourian Clarence Cannon heading House Appropriations; Elbert Thomas and John Lesinski on labor in the House; McKellar as appropriations chairman in the Senate.

Pointing at things to come is the fact that the President got rid of some powerful foes—Gearhart, foe of reciprocal trade in the House Ways and Means Committee; Knutson, anti-spending; Harness, who opposed public power; and Buffett of Nebraska, House Banking and Currency opponent of housing subsidies.

Strange as it may seem, some of the big issue legislation now being talked (reinstitution of the tax cut, excess profits taxes, other monetary restrictions), may not be brought up for passage. As it stands now, there will be a budget surplus next year of around $2,000,000,000 to $3,000,000,000. Unless there is a big budget outlay next year for lend lease, aid to China, heavy spending for welfare, social security, aid to education and housing, there will not be the necessity to put on taxes to balance the budget. Neither Truman or his Congress, however, will allow the Treasury to go into the red—unless there is an emergency requiring a 75 to 100-billion dollar budget.

AEC Clarifies Limitation On Uranium Ore Bonus

The Atomic Energy Commission, on being advised that there is some misunderstanding in the West over the requirements for payoff of the $10,000 bonus for discovery of radioactive ore, wants to correct that impression.

The wrong belief is that no radioactive ore in the Colorado Plateau is eligible for the bonus. Actually, according to AEC, only the carnotite-roscoelite type ores found in the Colorado Plateau are not eligible for the bonus. Any other type of radioactive ore, pitch blende, for example, containing 20% or more U_3O_8, in 20 ton lots, is eligible for the bonus.

"Prospectors for uranium ore need not worry, because no one has been able to develop 20 tons of carnotite-roscoelite type ore that will contain 20% U_3O_8." Should someone, by chance, succeed in developing a mechanical concentrate of 20% or more, then he would be out of luck in the Plateau country. A court might have to decide the limits of the Plateau should a high-grade discovery of this type of ore be found in the West, the AEC admitted. If a 20% concentration of carnotite were developed outside the Plateau, however, the Commission would probably pay the bonus.

Labor Sees Wage Boost And Revision of T-H Law

A fourth-round wage boost is a good bet, unless the bottom falls out of business. Strikes will be less risky, with or without a new "labor law" on the books. The new law probably will be in effect before the big fourth-round bout receives its test. John L. Lewis steps up for more money in June; steel negotiations for a new contract start in July.

The Taft-Hartley law will be changed, there is no doubt about that. The injunction will go, with the possible exception of a clause for "grave national emergencies," which would be directed at John L. Lewis. The closed shop will come back. Clauses which define unfair labor practices by unions will be wiped out or drastically softened. Some of the bothersome elections allowed by the present law are slated for extermination. Examples are: union shop, decertification, professionals, guards, crafts, etc.

The new law will be a revived and modernized Wagner Act. Taft-Hartley, as a name, must go. The new act will probably have something in it to curb jurisdictional disputes and secondary boycotts supporting jurisdictional disputes. It may also contain provisions for cooling-off periods in disputes.

The administration is after a 75-cent minimum wage, and will probably get it. The move up may be gradual, however, beginning at 65 cents, moving to 75 cents in a year or so.

Economists See Controls On Credit, Materials

The country is still in a highly inflationary situation. Overall production is now rising only slightly because the available labor force has been almost entirely committed.

Pressure continues on housing and steel, and other critical commodities, where heavy demands are eliciting no corresponding increase in supply. This means continued pressure on prices.

The economists point out that the inflationary pressure is "increasing at a decelerating rate." Translated, this indicates a trend toward stabilization.

Although some spending programs may slacken, ECA notably, the effect upon hard goods may even increase. Although the Marshall Planners say that a billion dollars might be knocked off the budget next year, the spending will swing away from food and soft goods and cut deeper into steel and other semi-finished critical metallic commodities.

The President has insisted that the military budget stay at $14,400,000,000, which means that the spending for hard goods will remain about the same as it is this year.

Money restrictions probably will get tighter. The administration would like greater authority to regulate bank credit. It wants to raise reserve requirements a full 10 percent, which is six percent more than the four percent granted this August, and to extend the requirements past next June. The 7,000 non-member banks would be brought in under this regulation —now they are not even subject to the four percent requirement. There is also the possibility of a requirement that banks tie up some loanable funds in secondary reserves which may be cash or interest-earning government bonds. Consumer credit controls (Regulation W) will be extended beyond June 30, if the President has his way.

Taxes are a big "if." No one thinks income taxes can be cut at all. The question is whether they will be raised. It seems that raising them will be a political impossibility.

Corporate profits, however, offer a tempting possibility, politically. The politicians reason that an increase in the higher corporate tax rates offers a chance to build a surplus without hurting too many citizens. It would also allow some large-scale spending. Congress would be hard to convince that large-scale spending was justifiable at the cost of deficit financing. This would mean controls. Only argument for deficit spending would be an emergency.

Some type of authority to allocate and limit use of scarce essential commodities has been labeled necessary, and the President will in all probability ask for it.

The President's Board of Economic Advisers intends to recommend that all of the remaining provisions of last July's economic program, those calling for curbing commodity speculation, for standby price, wage and rent controls and for rationing authority, be imposed. This is all contained in an "Emergency Powers Act" which has been devised by the National Security Resources Board and is ready for submission to Congress.

Anti-Trust Suits Aim at Patents, Pricing Abuses

More of the trend established by Justice Department since the war will be in store for industry next year. The trust-busters have been devoting considerable time lately to "conspiracies that hit the cost of living." The election is over, and this subject now fades into the background. The three important subjects the department will go all out on from now on in are: (1) patent abuses; (2) monopolies; (3) price fixing by people who sell to Federal, State, and local governments.

The Federal Trade Commission was in danger from a Republican administration. But, with the Truman coup, FTC is again strong and relatively unfettered. This means a continuation of the "report to Congress" type of indictment.

Action on Basing Points Seems More Unlikely

With the Democratic sweep of Congress, the probability of curtailing, or revamping, the basing point decision fades. The Capehart Committee of the Senate, which has been investigating the effects of the decision, will probably speed up its work so as to get a report in by the first of the year. The report, however, will be considered by the full staff of the Interstate and Foreign Commerce Committee, which by that time will be controlled by Democrats. If they choose, the majority members can pigeon-hole the Capehart report, then start the whole investigation over again. Senator Ed Johnson, of Colorado, will head the new sub-committee.

It is expected that the anti-monopoly aspect of basing point restrictions will receive a thorough airing by the Democrats. Senator O'Mahoney, long time anti-monopoly man who amended the resolution creating the Capehart group to include a general investigation into the problem of monopoly and economic concentration, will be new chairman of the Congressional Joint Committee on the Economic Report. In this powerful position O'Mahoney probably will launch an investigation into monopolistic practices.

Reciprocal Trade Pacts In Stronger Position

State Department is readying a third aid program for Greece and Turkey which will increase the aid already flowing to those two countries. In China, the situation is so tense that the State Department may suggest some hefty aid to counter Communist victories there.

There are indications that the Dutch and the Indonesians may reach a settlement soon. This may help the supply picture on several critical materials here.

The push to renew reciprocal trade agreements authority is obvious. Also, chances of the ITO passing Congress now are improved.

Military aid to the Brussels Powers is a virtual fact. What the administration is waiting for is a statement of requirements from the Western European nations. This would be screened, as was the Marshall Plan requirement last year. The screened requirements of the nations then would be shaped into the military-aid program and sent over the jumps in Congress. Estimates on the cost, dollarwise, run from one to five billions.

Portal-to-Portal May Survive T-H Revision

The Supreme Court has sustained one of the labor laws passed by the 80th Congress which may not be touched by its successor, the 81st. It is the 1947 Portal-to-Portal Act, which wiped out back claims for overtime wages due to the workers' activities on the plant property before and after the regular working hours. It also protects employers against liability for such payments in the future unless they are required by written contract or by custom.

The drive for portal-to-portal wages which led to enactment of the law, signed by President Truman, was begun by CIO unions in the Mt. Clemens Pottery case. The AFL frowned on the movement, preferring to rely on the terms of its contracts, which are not hindered by the law.

Secretary of Labor Maurice J. Tobin told the AFL convention in Cincinnati that he favored repeal of the Hobbs Anti-Racketeering Act and the Lea Anti-Petrillo Act, as well as the Taft-Hartley law.

The Supreme Court upheld the portal-pay law, in effect, when it turned down an appeal by 13 employees of B. H. Hubbert & Sons, Inc., Baltimore, from a decision of the U. S. Circuit Court at Richmond, Va., which had denied their claims for retroactive portal-to-portal overtime pay under the wage-hour law. They are members of the United Steelworkers, CIO.

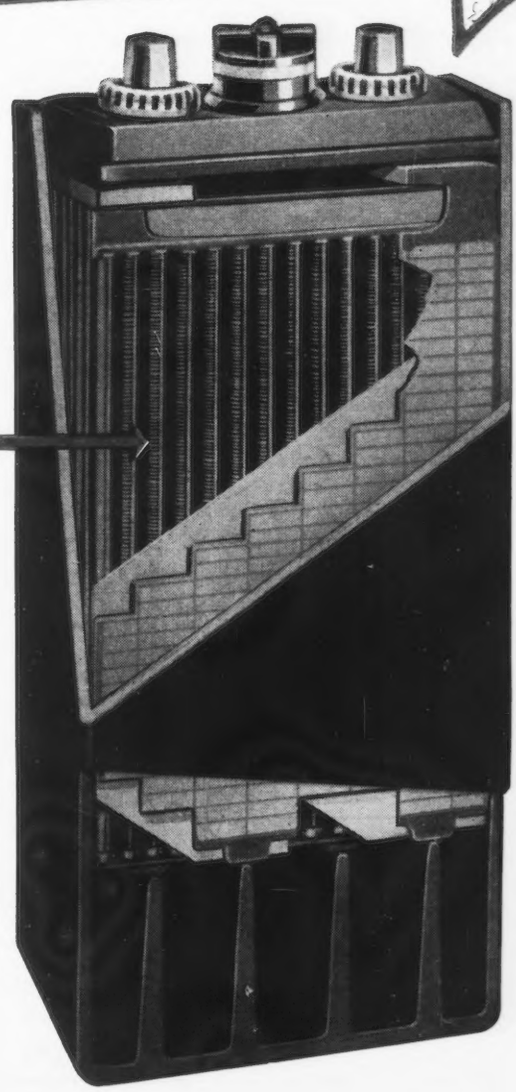
The suit was filed in Feb., 1947, a few months before the new law was passed by Congress. The employees sought back overtime pay for time spent on the premises changing clothes, preparing tools, washing up, punching the time clock, and similar activities outside working hours.

The Court postponed action on a direct constitutional test of the law brought by members of the CIO auto workers' union against General Motors. Their overtime claims were dismissed by the Federal District Court in Buffalo. This action was upheld by the Circuit Court in New York, which held the law to be a valid exercise of congressional power.

Exide IRONCLAD BATTERIES

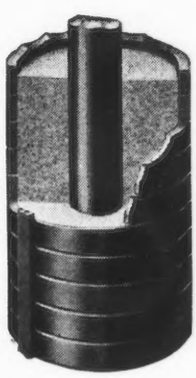
HAVE ALL FOUR VITAL CHARACTERISTICS FOR SAFE, DEPENDABLE MINE HAULAGE SERVICE

1. **HIGH POWER ABILITY** . . . abundant reserve power plus an ability to discharge at high rates.
2. **HIGH ELECTRICAL EFFICIENCY** . . . hence low power costs.
3. **RUGGEDNESS** . . . to withstand hard usage.
4. **LONG LIFE *and* MINIMUM MAINTENANCE** . . . which add up to better service at a saving.



Because of these outstanding qualities, Exide-Ironclad Batteries are used by more mine operators than all other batteries combined.

Most batteries look much alike on the surface. But inside are the differences that determine power, performance and battery life. One notable difference in Exide-Ironclad construction is the positive plate.



THE POSITIVE PLATE consists of a series of slotted tubes which contain the active material (see small illustration at left). So fine are these slots that, while permitting easy access of electrolyte, they retard active material from readily washing out . . . thus assuring years of safe, dependable, day in and day out mine haulage service.

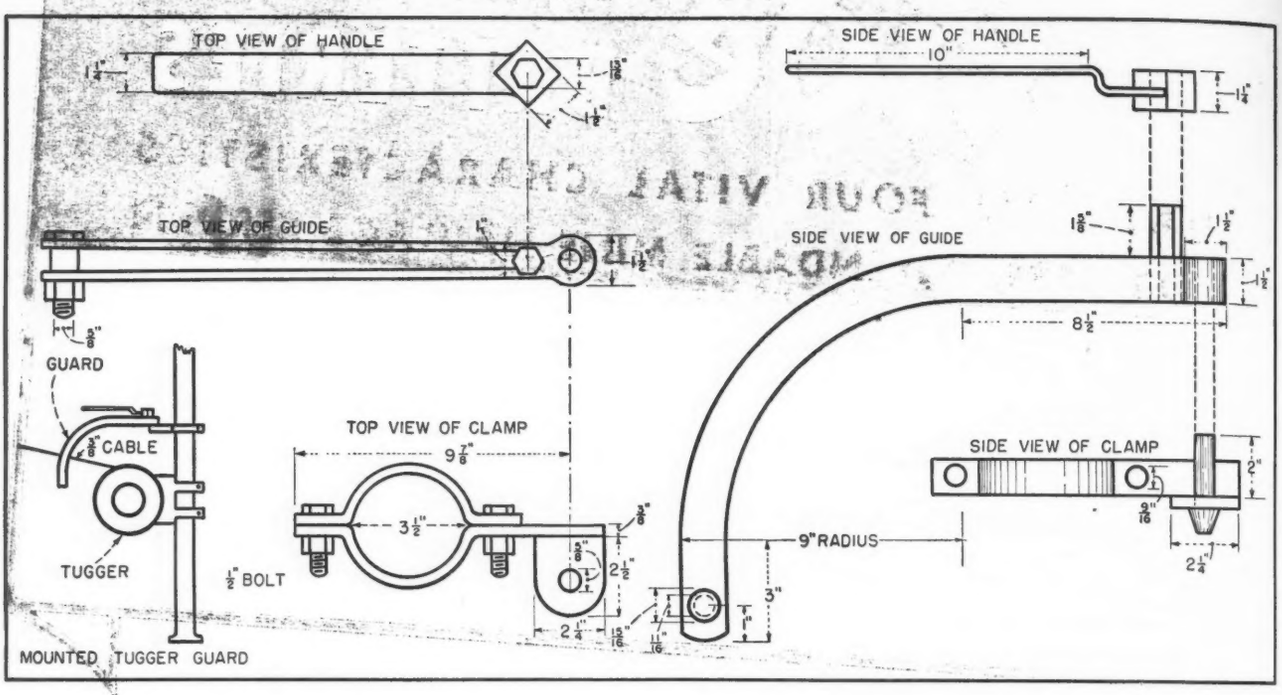
1888—Dependable Batteries for 60 Years—1948

If you have a special battery problem, or wish more detailed information, write:

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32

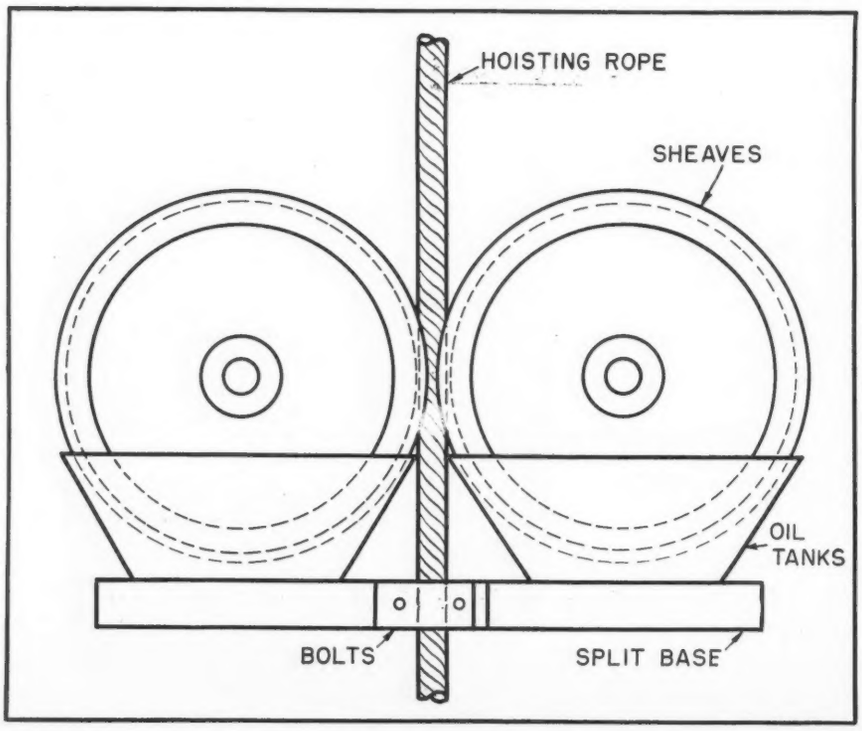
Exide Batteries of Canada, Limited, Toronto

OPERATING IDEAS



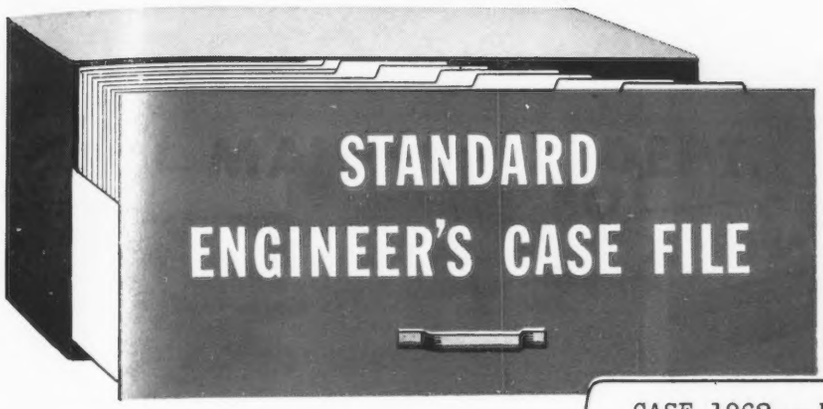
Safety Device on Tugger Hoist Protects Miners

Miners operating small utility hoists may catch their fingers in the cable and suffer crushed or badly lacerated fingers as a result. To prevent this type of accident, the operating staff of the Homestake Mining Co., Lead, S. D., devised a tugger guard, which enables the operator to guide the winding of the cable without exposing his hands to injury. Details of the device, and method of mounting are shown in the above illustrations. Note the detachable handle used to guide the rope. Since installation of this device this type of injury has been almost completely eliminated.

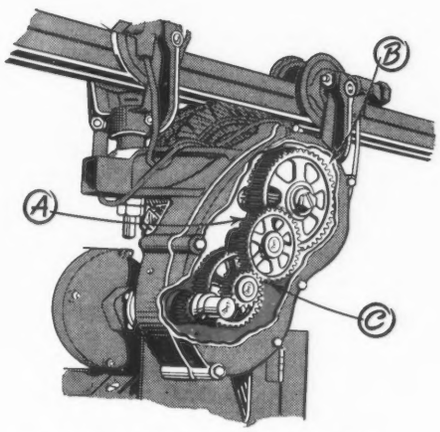


Twin-Sheave Device Lubricates Ropes

Shown in the accompanying sketch is a simple and effective method of lubricating hoisting ropes. It was evolved and used for many years at a large gold-silver operation situated in the central part of Mexico. Parts making up the rope lubricating system include two sheaves; two oil tanks with bearings on each side to accommodate the sheave shafts; and a split base. The sheaves are mounted so that when the hoist rope is to be lubricated, the sheaves are moved in contact with it and are rotated in the oil bath by the moving rope, thereby picking up the oil from the bath and delivering it to the rope. The sheaves are moved back when the rope has been sufficiently lubricated. This is done by removing the bolts in center of the split base.



CASE 1062 -- MAINTAINING LUBE FILM ON HEAVY-DUTY GEARS.



HOIST GEAR UNIT FOR OVERHEAD CRANE

Viscous and tacky Calol Vistac Oils stuck tight under extreme pressures on hoist gears. Efficient for all heavy-duty gears, like industrial reduction sets. Come in six grades, 9X (SAE 10) to 45X (SAE 40). Apply by forced-feed or gravity lubricators, bottle- or wick-oilers.

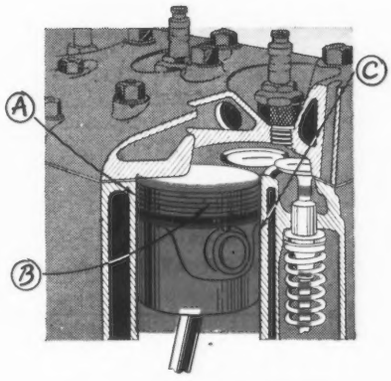
A. Contain oiliness and extreme-pressure compounds. Tough film won't rupture, even on slow-moving gears with extreme pressures on wide area for long time.

B. Economical - little required to provide adequate lubrication and dissipate heat. Resist highest operating temperatures.

C. High affinity for metal maintains lubricating film, reduces power loss and wear.

Calol Vistac Oils also recommended for lubrication of air hammers, rock drills and other air-powered tools ... atomize quickly and stay fluid at low temperatures.

CASE 1017--REDUCING OVER-HAULS IN GASOLINE ENGINES.



SECTION OF GASOLINE ENGINE

When gasoline engines were lubricated with compounded RPM Motor Oil, pistons, cylinders, valve stems and other oil-contacted parts remained clear of carbon, gum and lacquer. Wear was minimized and rusting was not a problem. Recommended for gasoline engines. Five grades: SAE 10/10W to SAE 50.

A. Contains detergent which loosens and removes carbonaceous matter, keeps it dispersed in the oil so it is removed with drainings. Assures free-working rings, valves and other parts.

B. Sticks to hot spots - reduces usual wear on upper cylinders and pistons.

C. Adherence to cylinders when engine is idle minimizes starting wear and prevents rusting - moisture will not cut through oil film.

Other compounds in RPM Motor Oil resist oxidation, prevent corrosion of bearings, and stop foaming.

For additional information and the name of your nearest Distributor, write

STANDARD OIL COMPANY OF CALIFORNIA

225 Bush Street, San Francisco 20, California

The California Oil Company
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The California Company
17th and Stout Streets, Denver 1, Colo.

Standard Oil Company of Texas
El Paso, Texas

RPM CALOL

Trademarks Reg. U. S. Pat. Office

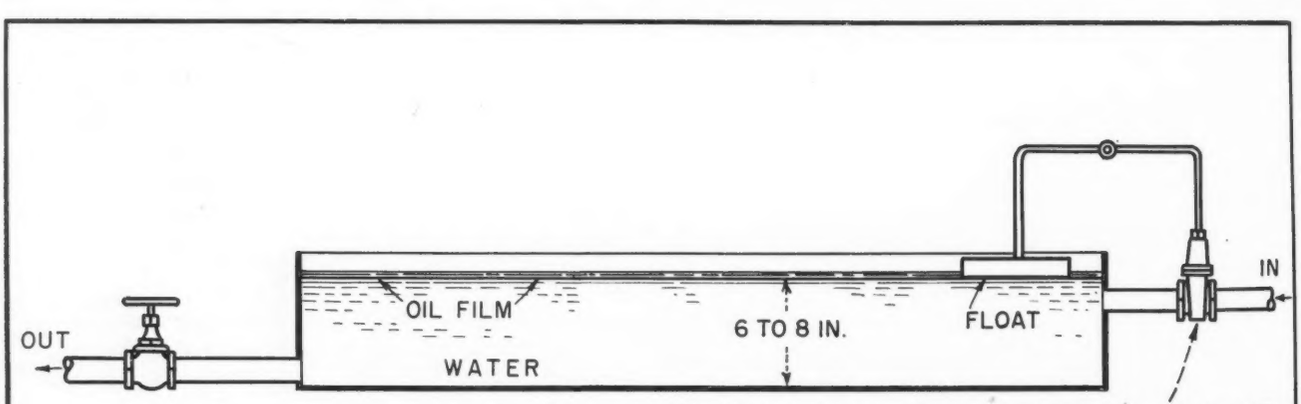
Portable Testing Outfit for Placer Mine

Contrary to common opinion, Thomas Edwin Smith of Central City, Colo., reports that the fine gold in the Clarks Fork of the Yellowstone River is easy to recover. He used the portable equipment shown above in 1946 to perform tests at a point south of Laurel, Mont.

The sluice shown is 8 ft. long, 12½ in. wide and has a slope of 1¾ in. per ft. The box is lined with Rubberoid roofing overlaid with burlap and a ½-in. screen to hold the burlap down. The combination feed box and screen has a sheet metal bottom on the upper one fourth, and a ½-in. mesh gravel screen under the remainder. It rests at an angle of 37 deg., at which slope wet gravel will slide off.

Mr. Smith conducted the tests by placing six or seven shovels of gravel on the screen and then using the long-handle dipper shown to swing water from the stream onto the gravel. He continued washing and shoveling until exactly 2 cu. yd. of bank gravel had been washed through. This took 8 hr. Then after washing the burlap and screens, he panned the washings down to black sands which he transferred into a copper bottom amalgamating pan. At this point he noted a considerable amount of free gold in the bottom of the iron pan. He concludes by reporting that he "collected the amalgam, squeezed it through heavy cloth, burned it to a button of retort sponge, and called it a test."

The car and trailer shown at right above were used to transport testing equipment.



Water Heater for Desert Mining Properties

Adolf E. Place, mining engineer of Boulder City, Nev., reports that the above equipment was installed to obtain hot water in desert mining plants and homes. The sun's rays are used to heat the water. The unit consists of a rectangular tank, of any desired size, which is installed on a roof. An inlet and outlet are connected to circulate water through a piping system. The piping outlets are arranged to leave a sheet of water 6 to 8 in. deep in the tank at all times. The sun heats the water during the day, and it may be drawn off as needed.

To prevent evaporation, the water is covered with a layer of oil which floats on top, and well above the inlet and outlet valves. Although this arrangement has been successful, the box can also be covered with a glass top instead. Painting the tank black, and insulating the outside to prevent radiation losses increases the efficiency of the equipment. The amount of water which can be heated, and the ultimate temperature of the water depend upon the season, the depth of water maintained in the tank, and the latitude of the point of installation.

Memo from our
RAW MATERIALS DEPT.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
OFFICE MEMORANDUM

DATE 8/11/48

TO. Metallurgical Dep't.

SUBJECT: Performance of Heat Treated JALLOY Steel at Benson Mines, Star Lake, N. Y.

1" x 6" heat-treated JALLOY #3 flats to reinforce truck-body bottoms and doors. Service--severe impact loading of hard rock magnetite ore from 5-yd. shovel. Year round operations in temperatures to minus 47°F. Severe abrasion in unloading. Installations have been in service 13 months --305,000 tons handled per truck. Units equipped with these flats maintain bottom flatness and clean readily. Insignificant wear at this date indicates at least 2 years life before replacement is necessary.

WHAT better "laboratory" could we find to prove the qualities of J&L Steel than in the equipment required in our own operations?

The handling and moving of heavy, abrasive ore-bearing rock, at our Benson Mines, is a rugged test for any equipment. Yet our stone trucks equipped with heat-treated J&L JALLOY Steel reinforcing strips have run *more than a year* without bottom replacements. *And recent reports indicate at least two years life!*

These JALLOY strips receive the full impact of huge rocks *dropped* into the truck bodies, and withstand the abrasion caused by dumping load after load. This continuous resistance to shock is particularly noteworthy because of the embrittling effect of the sub-zero temperatures encountered during winter months.

J&L JALLOY is a fine-grain, heat-treated steel made in a wide range of physical properties with tensile strengths of 155,000 to 180,000 lbs. per sq. inch. Its inherent ability to withstand shock and abrasion adds life to equipment that must be tough and strong—such as: Rock crushers, Scrapers, Bulldozers, Dump cars, Power-shovel buckets, Truck bodies, Sandblasting equipment—or wherever abrasion and impact are limiting factors.

Manufacturers of trucks and trailers designed for heavy service will find JALLOY an excellent material for body bottoms, reinforcing strips exposed to severe abrasion, tail gates and many other applications. You'll find that JALLOY is a steel that stands up when the going gets tough. For more complete information, let us send you the booklet: "*Jalloy*—J&L *Alloy Steel.*" It includes data on properties, heat treatments and workability. The coupon at the right is for your convenience.

Jones & Laughlin Steel Corporation
412 Jones & Laughlin Building
Pittsburgh 19, Pennsylvania

Please send me your booklet: "Jalloy—J&L Alloy Steel."

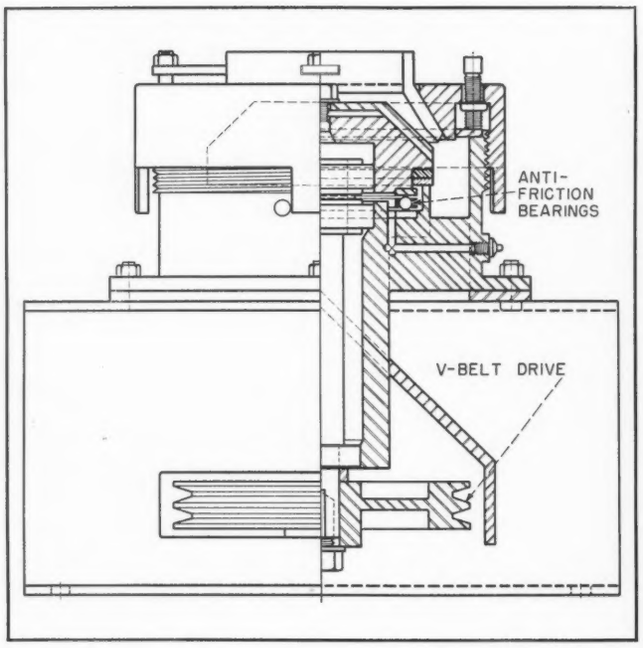
Name_____ Title_____

Address_____

_____

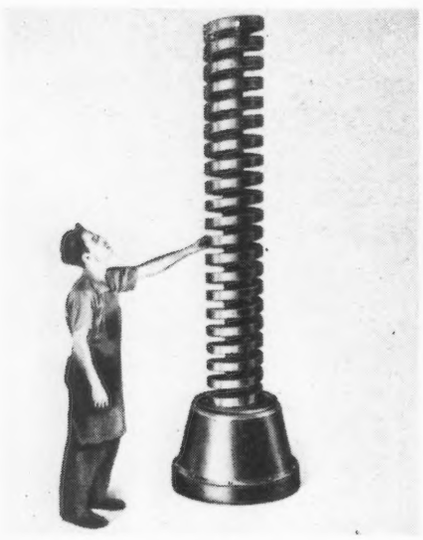
JONES & LAUGHLIN STEEL CORPORATION

EQUIPMENT NEWS



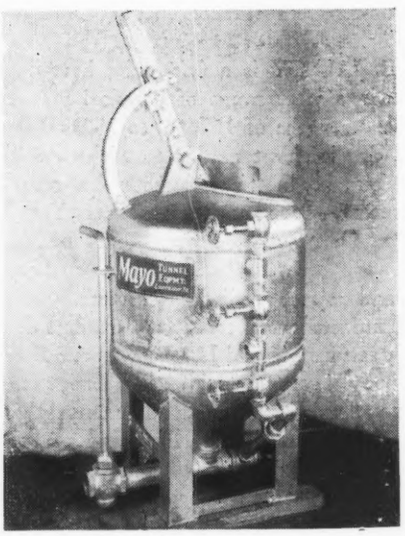
Crusher is More Efficient as Grinder than Ball Mill

The laboratory crusher shown above will take a ½-in. feed (choke or free-fed) and produce a minus 16-mesh product in one pass. In closed circuit with a fine screen at 1/16-in. set, the crusher may be used as a dry fine grinder with efficiency twice that of the standard ball mill. Laboratory tests on materials "ground" to 48 to minus 325-mesh, showed that the crusher operates as a grinder with an efficiency of 182 to 220% as compared to that of a ball mill grinding the same materials. The unit is made in 6 and 10-in. sizes and is suitable for use in laboratories, small pilot plants and ore sampling plants. A. W. Fahrenwald, dean of the Idaho School of Mines at Moscow, Idaho, developed the crusher. Outstanding mechanical features are: (1) Felt-sealed permanently lubricated ball-type spindle bearings which take up the lateral load. (2) Large ball bearings which take up the thrust load. There is no rotation on this bearing, only reciprocation, and hence no loss of energy in the form of heat. (3) V-belt drive permitting high-speed operation. (4) Manganese steel wear parts. (5) A large unobstructed crusher mount. A hopper may be fitted to the machine, capable of holding 50 to 100 lb.



VERTICAL VIBRATORY SPIRAL FEEDER, built by Syntron Co., Homer City, Pa., elevates and lowers bulk materials. Power consumption and maintenance costs are low because of the absence of moving parts.

GEIGER COUNTER, made by Fischer Research Laboratories, 1961 University Ave., Palo Alto, Calif., is equipped with loud speaker, headphones and visual indicator. An extension handle is provided to check for radio-activity in inaccessible places.

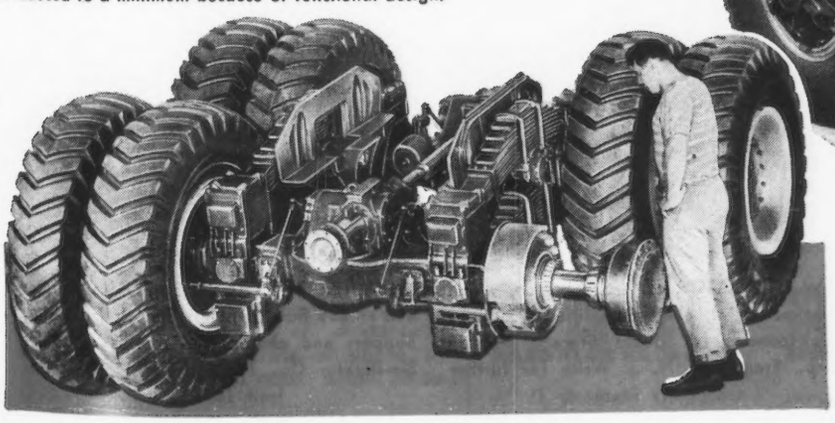


PNEUMATIC GROUTER for mine and tunnel construction work has 3½-cu. ft. capacity. The unit is made by Robert S. Mayo, Lancaster, Pa. For full description write for Bulletin No. 13.

For STEPPED-UP TONNAGE

NEW 30-TON MACK

Here's the famous Mack Balanced Bogie with the exclusive Power Divider which brings new standards of performance to off-highway hauling. Unusual flexibility and balance insure even tire loading, uniform braking and equal traction on all four wheels. Maintenance is reduced to a minimum because of functional design.



• Mack's new Model LRSW packs a 30-ton payload in its monster dump body — or pulls 55 tons as a tractor semi-trailer.

Big 275 h.p. super-charged Diesel keeps tonnage moving away from the shovels — fast. Massive frame is of alloy steel, reinforced and welded into one piece; built to stand up under the stiffest punishment. Mack's famed Balanced Bogie with exclusive Power Divider assures positive traction over difficult terrain and through slippery mud. Power steering and air-assist clutch mean easy handling, less driver fatigue, better maneuverability, safe and sure control. Roomy, all-steel cab has offset driver's seat for better vision.

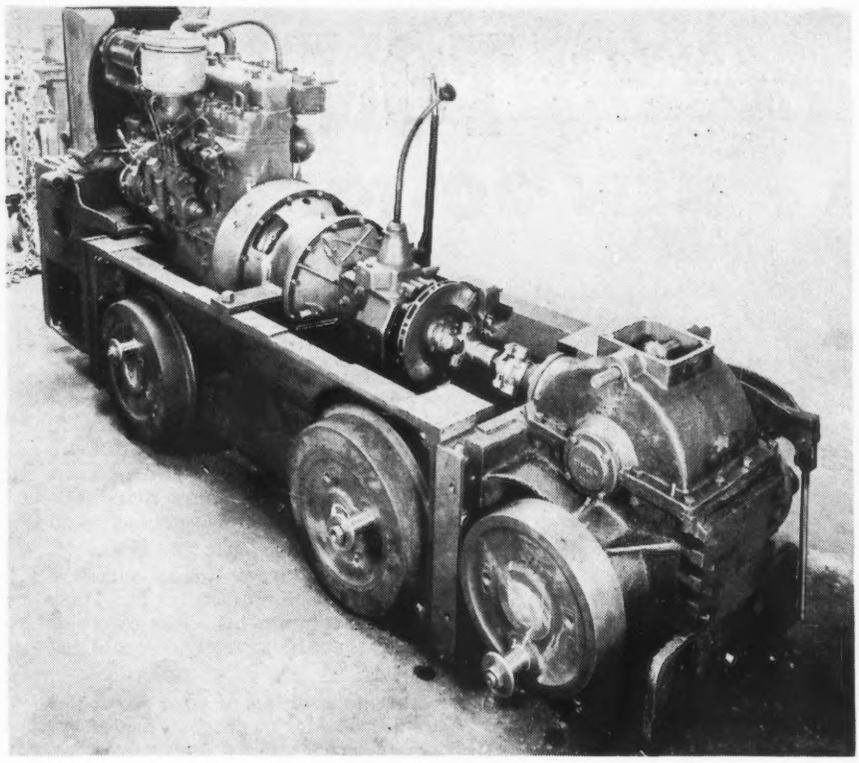
No other off-highway truck offers you so many outstanding features and advantages. No other manufacturer but Mack designs and builds so many of its components in its own factories — your assurance of trucks that are perfectly co-ordinated for utmost efficiency.

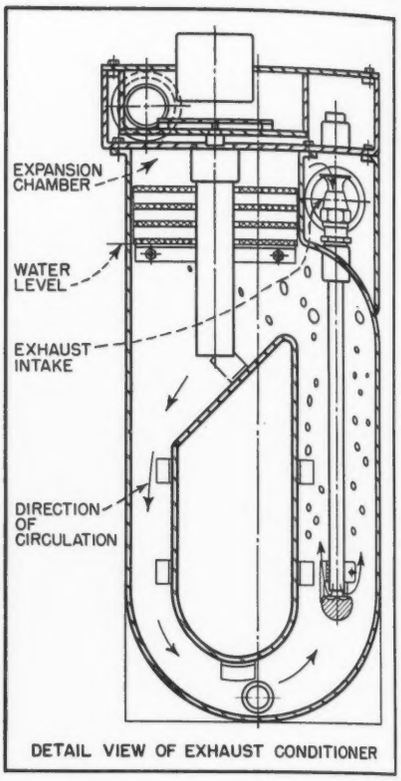
Let us give you full information in terms of your particular operation. Write or call your nearest Mack branch or dealer.

Mack

TRUCKS FOR EVERY PURPOSE

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa., Plainfield, N. J.; New Brunswick, N. J., Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada, Mack Trucks of Canada, Ltd.



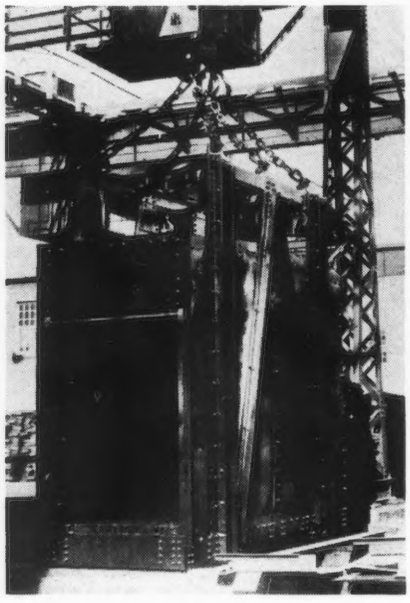


DETAIL VIEW OF EXHAUST CONDITIONER

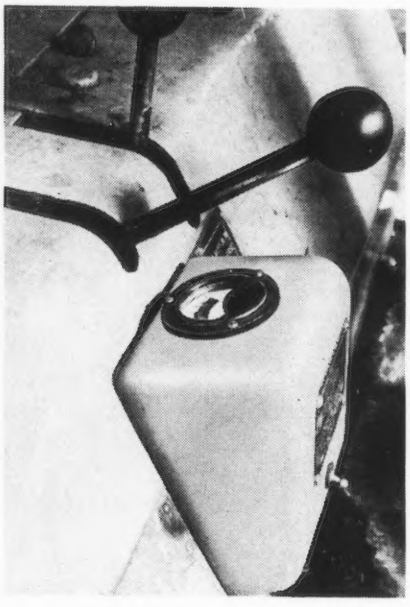
Conditioner Cleans Underground Diesel Exhaust

The chassis and exhaust conditioner of the latest model underground diesel locomotive made by the Ruth Co., Denver 2, Colo., are shown above. The locomotive weighs 5 tons and develops a tractive pull of 2,600 lb. Main mechanical features include a fluid drive, five-speed transmission, side-rod drive, 7½-cu.ft. air compressor, air-actuated post brakes and Timken bearings.

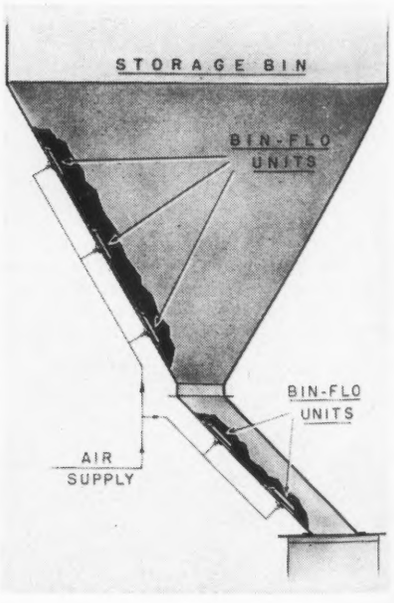
Exhaust gases are diluted with air before discharge in a jet-type conditioner. Extremely low back pressures are due to exhaustion of the gases into a column of gasified water circulating at high velocity. (See illustration.) Gases are cooled in a large expansion chamber wherein heat is dissipated by relatively slow diffusion of the gases in water vapor. A cyclone removes moisture from the gases as they discharge from the conditioner. The exhaust gases are further diluted by two Venturi tubes which mix five parts of air with one part of exhaust gas. This process also removes aldehydes and free carbon.



LIGHTWEIGHT MINE SKIP of 3½% nickel steel increased capacity 16% over carbon steel skips of same weight at Copper Cliff mines of the International Nickel Co., Inc., Canada.



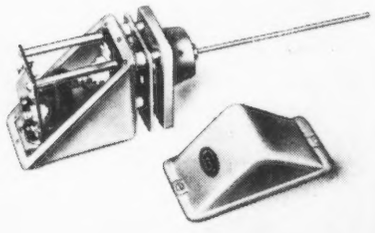
NEW INDICATOR for truck battery which gives momentary charge condition of battery is announced by Gould Storage Battery Corp., Trenton 7, N. J. Write for further descriptive literature.



NEW AERATING DEVICE provides uniform and steady flow of bulk materials from bins, hoppers and chutes. The unit is made by Bin-Dicator Co., 14615 Jefferson Ave., Detroit 15, Mich.

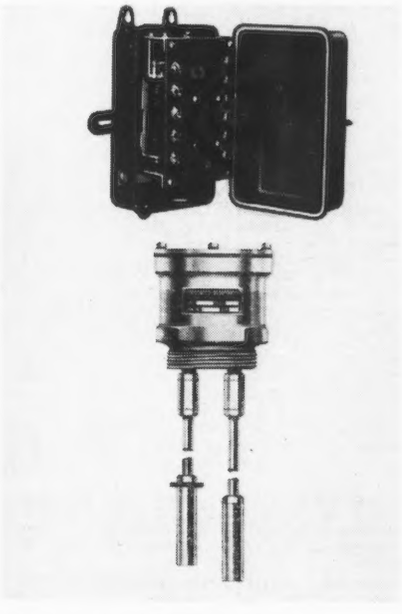
Plastic Pipe

Corrosion-proof plastic pipe has been developed by the United States Rubber Co. for use in chemical, mining, manufacturing and other industries. The pipe is made of the company's new Kralite plastic, a blend of synthetic rubber and thermoplastic resins. It will be supplied in rigid and semi-rigid forms in sizes ranging from ¼ to 2-in. outside diameter. For details, write the company at Rockefeller Center, New York, N. Y.



Combustion Safeguard

Fireye System FF-6, shown above provides electronic flame failure protection and semi-automatic ignition control for gas burning equipment and oil-fired equipment having gas pilot ignition. It is built for use in boilers, ovens, furnaces, kilns and dryers by Combustion Control Corporation, Cambridge 42, Mass.



Liquid-Level Control

Photoswitch Type 10CB1, manufactured by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass., consists of an electric relay operating from a probe circuit through a transformer and rectifier. It is useful for level control of electrically-conductive liquids such as solutions of ammonium chloride, copper nitrate, sulphate, sodium chloride, and other acids, bases, and salts.

Take it! Try it!

on your men

Lamp Brackets hold either electric or carbide lamps; optional at 15c ea. Hats in lots of 100 or more $3.85 ea.

New Waterproof Material

New Comfort... Style... Protection

Amazingly resilient! Permanently waterproof! New Material! Made up of long intercrossed fibres bonded with a resinous binder. Crown is tough as whalebone. High dielectric strength. Light weight. Shock-absorbing crown and full floating hammock—for greater spinal protection. Six-second hammock and sweatband change with wedge-type hangers. Save money. One size fits all heads. Quick-adjusting headband and hammock drawstring. Write for new circular • **E. D. BULLARD COMPANY** • 275 Eighth Street, San Francisco 3, California • *Distributors in principal cities.*

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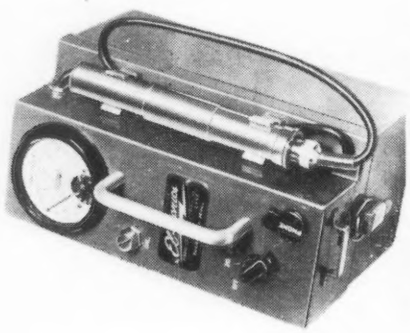
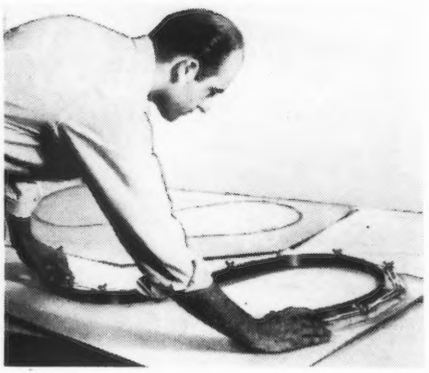
HARD BOILED HAT

E. D. Bullard Co., San Francisco, Originators of Industrial Head Protection

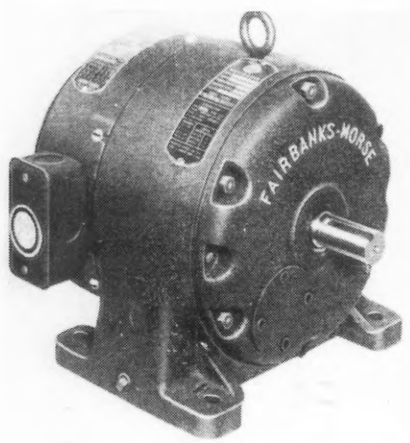


PORTABLE GEIGER METER for survey purposes weighs only 8¾ lb. Unit has sliding beta shield and uses standard radio tubes. Battery life is 200 hr. Meter is made by El-Tronics, Inc., Philadelphia, Pa.



FLEXIBLE ADJUSTABLE STEEL TEMPLATE is designed to save time for shop and construction projects of all types. Templates may be obtained from Clark & Poggenburg, sales agents, 4900 Wynnefield Ave., Philadelphia, Pa.

SAFETY SHOE, made by Iron Age Division, H. Childs & Co., Pittsburgh 22, Pa., has steel toe box, is patterned after proven and practical U. S. Army combat boot.



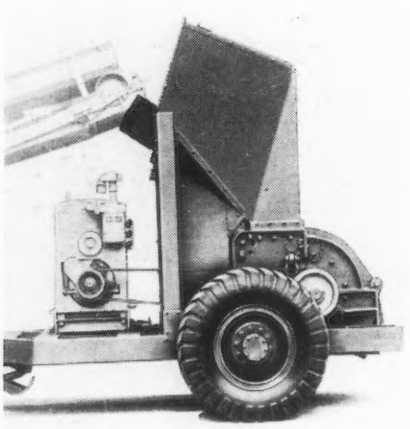
"PANCAKE CONSTRUCTION" is the term used to describe this compact gear motor with axial air gap, announced by Fairbanks Morse & Co., Chicago 5, Ill. It is made in ¾ to 10-hp. sizes.

Materials Disposal Units

Catalog No. 448, of Allen-Sherman-Hoff Co., 225 S. 15 St., Philadelphia, Pa., illustrates and describes pneumatic materials handling systems involving combinations of the following equipment: the "Windswept" dust valves for feeding the system; "Ashcolite" pipe and fittings for conveying the medium; and "Hydoseal" pumps for pumping the waste to filling sites. Other installation diagrams show the use of cyclone separators from which the material may be discharged dry for bagging; mixed with water in a dustless unloader; or a batch mixer for a controlled end product. One diagram shows a discharge system directly from a vacuum producing unit into a surge tank from which the material is run by gravity to a point of final disposal. In addition to these flowsheets the following units are shown: vacuum sealing continuous feeder, continuous dustless unloader, and batch-type dust conditioners.

Precipitators Introduced

Koppers Co., Inc., Pittsburgh 19, Pa., is introducing to American industry a line of Koppers-Elex Electrostatic Precipitators for removal of solid or liquid particles from industrial gases. The units are manufactured under license from the Swiss firm Elex S.A. One installation recovering gypsum from calcining kettles showed efficiencies of 98.7 to 99.8%. Precipitators for solid particles are designed for periodic rapping to discharge dust from the collecting electrodes. Rapping is actuated by clock-timer controls. Electrical power units for the precipitators are of two types—the "Elex-Pak", and the "Vac-Pak" for which no special substation is required. These new packaged power units provide high-voltage d.c. current. Units are designed to meet specific requirements for kettles, mixers, dryers, conveyors, grinding mills, in the metallurgical industry.



NEW PORTABLE CRUSHING UNIT is announced by Athey Products Corp., Chicago, Ill. The unit consists of an impact mill powered by a diesel engine. It is mounted on a two-wheel, rubber-tired trailer.

BULLETINS

Lifting Magnets. Engineering data and descriptions of high-power lifting magnets are included in Catalog 448 issued by Magnetic Engineering & Mfg. Co., Clifton, N. J.

Smelting Equipment. Complete information on sintering, smelting and refining equipment manufactured by the Mace Co., Denver 5, Colo., is presented in a new "Mace Smelters Catalog."

How to Select a Motor. Bulletin 05B6107A, published by the Allis-Chalmers Co., Milwaukee 1, Wis., describes motors of 1 hp. and larger for driving pumps, exhausters and other power house auxiliaries, and includes a useful motor selection chart.

Loader for Close Quarters. Bulletin K5-B, issued by N. P. Nelson Iron Works, Inc., Clifton, N. J., describes a new bucket loader for handling loose materials in plant yards. A pivoted discharge equipped with a belt conveyor loads trucks.

Diesel Tractors. Caterpillar Tractor Co., Peoria 8, Ill., has released Form 10980 which presents numerous sectional views and parts illustrations of the Diesel D6 track-type tractor.

Radioactive Tracers. Tracerlab, 55 Oliver St., Boston 10, Mass., has published issue No. 12 of Tracerlog which lists radioisotopes and prices; also equipment used to perform tracer tests.

Synchronous Motors. Electric Machinery Mfg. Co., Minneapolis 13, Minn., has just released Bulletin 1200-PRD-175 covering low-speed synchronous motors (less than 500 rpm.) and Bulletin 1100-PRD-181 covering high-speed synchronous motors.

Pulleys. Continental Gin Co., Birmingham 2, Ala., has published a new catalog describing and illustrating transmission and conveyor pulleys of all types.

Furnaces. Denver Fire Clay Co., Denver, Colo., has published a new catalog listing forging, heat-treating, melting, assaying, laboratory and testing furnaces.

Storage Battery Output. Gould Storage Battery Co., Trenton, N. J., offers a booklet "Theoretical Power Outputs of Various Storage Battery Types," prepared by Dr. Eugene Willihnganz, director of research for the company. The booklet considers all the metals and metal oxides practically available for storage battery construction and evaluates their output in watt-hrs. per lb., discharge rate, etc.

War on Corrosion. International Nickel Co., Inc., 67 Wall St., New York, N. Y., has published a booklet "First Aid" which lists 200 standard products for corrosive or high temperature service. Among the items listed are balls, floats, nails, bolts, pipe, gaskets, valves, tags and wire rope.

Automatic Weigher. Streeter-Amet Co., 4101 N. Ravenswood Ave., Chicago 31, Ill., has issued a folder describing

the M-118-D weighing machine capable of automatically printing and visually indicating loads from 1,000 to 100,000 lb.

Tungsten-Carbide Bits. Catalog M-5, issued by Kennametal, Inc., Latrobe, Pa., lists and illustrates the company's complete line of tungsten-carbide bits, drills and augers for the mining industry.

Slings and Chains. Cleveland Chain & Mfg. Co., Cleveland 5, Ohio, has released folder SC-48 which gives safety rules and full data on chain inspection, use and care.

Jaw Crusher. Construction features of the A-1 jaw crusher are described and diagrammed in booklet 07B6369B published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Nuclear Charts. Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh 30, Pa., has published 6 wall charts in two colors illustrating important phases of nuclear physics, and a 32-page booklet covering the basic subjects of nuclear physics. The complete set is available from the company for $1.00.

Crushers. Straub Manufacturing Co., 505 Chestnut Street, Oakland 7, Calif., announces publication of Bulletin 605 illustrating and describing company's line of new Kue-Ken Simplex crushers. Sizes range from 12x2¾ in. to 42x25 in.

INDUSTRIAL NOTES

Ohio Brass Co. has moved its Boston office from 49 Federal St. to 620 Boston Chamber of Commerce Bldg., 80 Federal St.

C. M. Gegenheimer has been appointed district manager in charge of the Chicago office of **Marion Power Shovel Co.**, Marion, Ohio. He succeeds **David E. Rizor** who has been transferred to the home office.

John S. Conway has been appointed general sales manager of **Koehring Co.**, Milwaukee 10, Wis. **John E. Chadwick** has been appointed assistant sales manager, and **R. E. Stewart**, export sales manager.

J. J. Murray has been appointed export manager of **Hewitt-Robins, Inc.**, New York 17, N. Y.

C. R. Fischer, 632 So. 48th St., Philadelphia, Pa., has been appointed sales representative for **Geo. P. Reintjes Co.**, Kansas City, Mo., manufacturers of suspended walls and arches.

Joseph T. Ryerson & Son, Inc., have recently opened a steel-service plant in Emeryville, Calif., to serve the San Francisco Bay area.

Thomas A. Cantrell has been appointed district manager of the **Euclid Road Machinery Co.** for western New York, Ontario and Quebec.

John F. Flippo, formerly assistant manager of the Pittsburgh District sales office of the **Atlas Powder Co.,** has been transferred to serve as assistant manager of the Chicago sales office. **J. L. Wetzel** succeeds Mr. Flippo.

V. L. Snow has been promoted to assistant sales manager of the **Euclid Road Machinery Co.**

C. W. Staacke, belt conveyor engineer has joined the staff of **Hewitt-Robins, Inc.,** as technical consultant.

NORTH • EAST • SOUTH • WEST • IT'S SCHRAMM!

CHOOSE *as others have* **THE MODEL THAT BEST FITS YOUR NEEDS!**

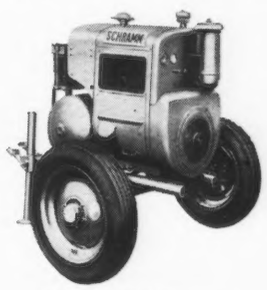
There's a Schramm Air Compressor, size and model, to meet your specific needs!

Below are listed six of the many Schramm models, portables ranging from 20 to 420 cu. ft. of actual air, the stationary ranging from 2 to 600 cu. ft. displacement.

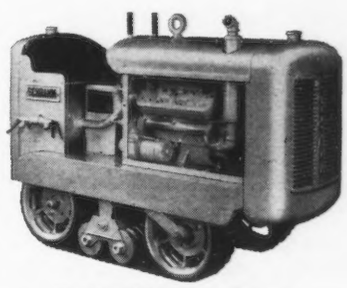
On all models performance records are evidence of their high quality. You will find the name Schramm written on every important page in compressor history.

Features you get in Schramm are: 100% water cooled, assuring ideal performance summer and winter; mechanical intake valve, forced feed lubrication, and electric-starter starting. All Schramms are compact, lightweight, easy to operate.

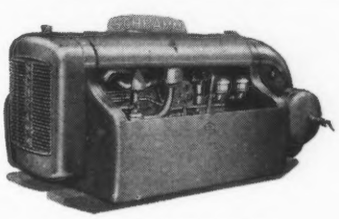
We invite you to write today for fully illustrated catalog describing in detail each of the Schramm Air Compressors shown here . . . plus a wide range of other models. We feel the Schramm story is a good one, and offers you a sure way to get your many compressed air jobs done quickly, efficiently, and economically.



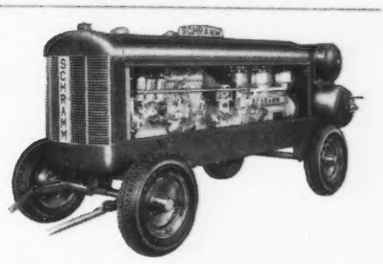
20/35 Model Compressor



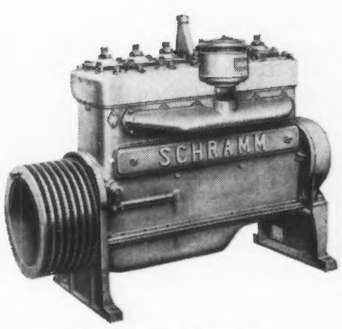
No. 60 Self-Propelled Compressor



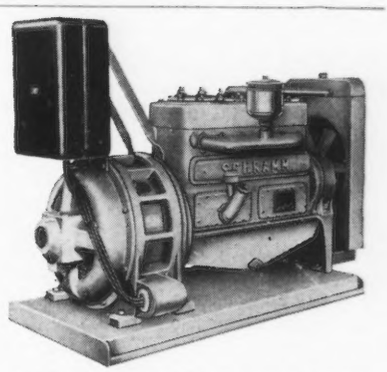
Skidded for Truck Mounting



Diesel Engine Drive



"V" Belt on Flat Pulley Drive



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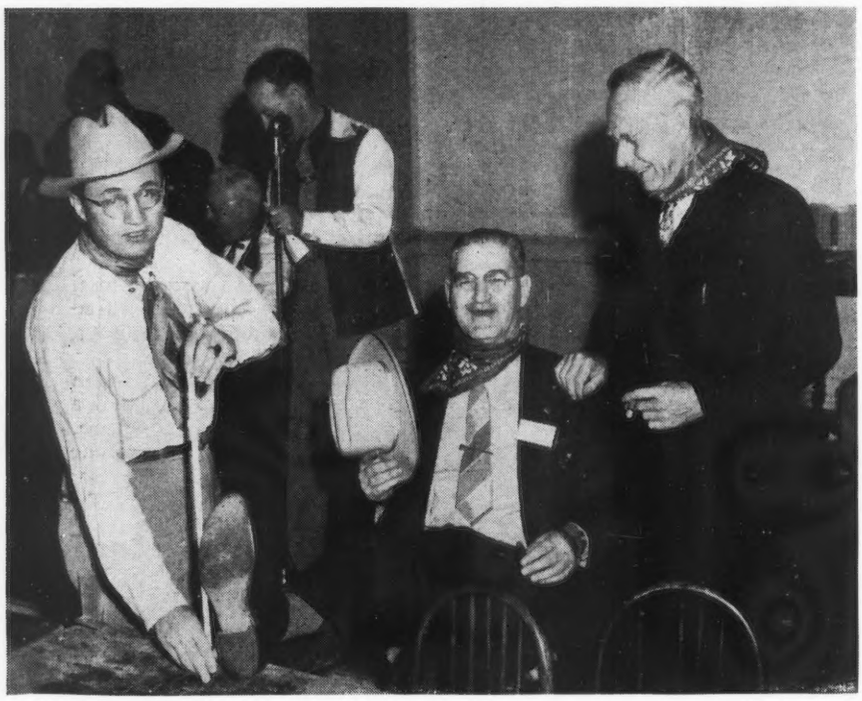
PERSONAL NEWS



WINNER OF THE BIG FOOT Contest at the breakfast given by the Rancheros Club of El Paso for the International Mining Days celebration and regional meeting of the American Institute of Mining and Metallurgical Engineers held in El Paso, October 25, is R. H. Mills, U. S. Potash Co., Carlsbad, N. M. Shown in the photograph are: left to right, Al Washburn, representing the Rancheros Club, Mr. Mills, and Dr. W. E. Wrather, director of U. S. Geological Survey, Washington, D. C. and president of the AIME. (Photo courtesy Herald-Post, El Paso, Tex.)

Howard O. Gray, mining editor of the Joplin *Globe & News Herald* and secretary of the Tri-State Zinc & Lead Ore Producers Association, has resigned to engage in private business. Prior to becoming secretary of the association, in Aug., 1947, he served as statistician and assistant to three secretaries. For the past several years Mr. Gray has been Tri-State correspondent for *Engineering & Mining Journal* and *E&MJ Metal & Mineral Markets*. He is an associate member of the Tri-State section, AIME.

C. E. Stover, for the past 25 years associated with Evans-Wallower Zinc, Inc., its predecessors, Evans-Wallower Lead Co., and Goldenrod Mining & Smelting Co. has been named secretary of the Tri-State Zinc & Lead Ore Producers Association, succeeding **Howard O. Gray**, who has resigned.

Frank N. May has recently been made assistant vice president of the Chile Exploration Co. and Andes Copper Mining Co.

T. J. Barker has joined the engineering department of Snyder Mining Co. at Chisholm, Minn.

Donald D. Kennedy, chief, International Resources Division, Department of State, acted as delegate representing the United States at the meeting of the International Tin Study Group held at The Hague, Oct. 25. The advisers accompanying him were: **Carl Ilgenfritz**, vice president, U. S. Steel Corp.; **Evan Just**, consultant, Metals Division, Economic Cooperation Administration; **W. F. McKinnon**, associate director, Office of Metals Reserve, Reconstruction Finance Corporation; **Charles Merrill**, chief, Metal Economics Branch, Bureau of Mines, Department of Interior, and **Erwin Vogelsang**, chief, Tin and Antimony Section, Metals Division, Department of Commerce.

C. E. Prior, resident engineer in London for American Smelting & Refining Co., has returned from a two month's trip through Rhodesia, South Africa and Portuguese East Africa. **Arthur Browne**, also of the London office, has returned from a reconnaisance in Mozambique.

Charles Kinghorn, chief engineer for Cresswell Roll Forming Co., Montreal, Can., is directing the roll forming process at Permanente Metals Corp.'s Trentwood rolling mill.

R. F. Goodwin has been named president of the newly formed subsidiary of the American Smelting & Refining Co., known as the Asarco Exploration Company of Canada, Ltd. The other officers are: **J. C. Emison**, vice president and treasurer; **M. W. Hotchkin**, vice president and managing director; **G. A. Brockington**, secretary, and **E. C. Corson**, comptroller.

Donald Williamson, formerly geologist for American Smelting & Refining Co. at Wallace, Idaho, has been transferred to Neptune Gold Mining Co., Nicaragua, as resident geologist.

L. H. Cole, mining engineer with the Department of Mines and Resources of the Canadian government, has retired after 38 years in government service.

Dr. Wilson H. Elkins, former president of San Angelo Junior College, was recently appointed president of the University of Texas College of Mines at El Paso. A graduate of the University, he received a Rhodes scholarship at Oxford where he earned his Bachelor of Letters and Doctor of Philosophy degrees. Dr. Elkins succeeds **Dr. D. M. Wiggins**, who resigned to become president of Texas Tech, Lubbock, Tex. Since that time **Dean Eugene Thomas** has served as acting president.

N. C. Urquhart and **H. L. Roscoe** have been named directors of the Mining Corporation of Canada.

Dr. John G. Dean, International Nickel Co., Inc., has been appointed head of the Industrial Chemicals Section, Development & Research Division of the company. He replaces **O. B. J. Fraser**, assistant manager of the division, who has been directing the section.

Kwang-Chi Tu has been awarded the E. J. Longyear Co. fellowship in metalliferous economic geology in the department of geology at the University of Minnesota. Mr. Tu is conducting experiments on hydrothermal alteration at high temperature and high pressures under the supervision of **Dr. J. W. Gruner.**

J. W. Downey, formerly engineer and mine superintendent at Food Machinery & Chemical Corp.'s property in Green River, Wyo., is engaged in consulting mining engineering work with offices at 1045 Sansome St., Room 204, San Francisco, Calif.

Jonathan P. Falconer, general manager of the Foley Construction Co., Pleasantville, N. Y., and his aide, **F. X. Minelli**, left recently for Antofagasta, Chile, to prepare for construction of a copper smelter at Chuquicamata.

JOEL M. BOWLBY

Joel M. Bowlby, former president of the Eagle-Picher Mining & Smelting Co., has been made chairman of the board. He will continue as chief executive officer and general manager of all companies in the Eagle-Picher system. Mr. Bowlby has also assumed the board chairmanship of the Eagle-Picher Co., succeeding Joseph Hummel, Jr., who was named honorary chairman.

ELMER ISERN

Elmer Isern, vice president of Eagle-Picher Mining & Smelting Co., was elected president at a recent meeting of the board of directors. He has been in charge of Eagle-Picher's mining and smelting operations since 1944 and has been active in the American Mining Congress, American Zinc Institute and AIME.

H. S. Fowler, former general superintendent of the Blubber Bay operation of Pacific Lime Co., has joined the engineering staff of Denver Equipment Co., Denver, Colo.

R. E. Legg, formerly manager for Conwest Exploration Co., British Columbia, has been appointed manager at Canadian Exploration Co.'s Emerald tungsten mine, Salmo, B. C.

Harry Wallace Knight, of Toronto, Can., has been elected a director of the American Zinc, Lead & Smelting Co. Mr. Knight is president of Golden Manitou Mines, Ltd., and a director in other Canadian mining operations. He is a partner of Draper, Dobie & Co., Toronto.

(*Continued on Page* 122)

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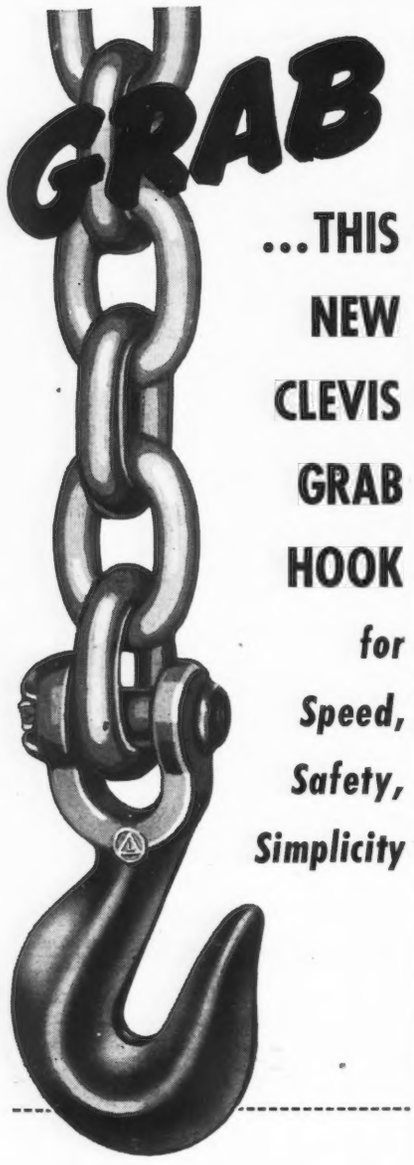

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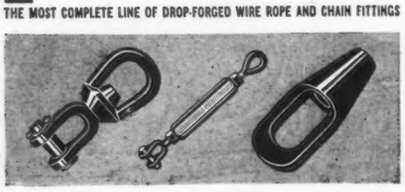

Personal News *(Continued)*

T. SPENCER SHORE

T. Spencer Shore, industrialist and investment banker and member of the board of directors since 1943, has been elected president of Eagle-Picher Co.

Alden G. Roach, president of Consolidated Western Steel Corp., has succeeded **J. Lester Perry** as president of Columbia Steel Co., steel-producing subsidiary of U. S. Steel Corp. on the Pacific Coast. Mr. Perry, formerly president of Carnegie-Illinois Steel Corp., was called back from retirement on May 1, 1947 to assume the presidency of Columbia following the sudden death of its president, **William A. Ross.** Mr. Perry will now remain with U. S. Steel, serving in an advisory capacity.

Dr. Charles P. Berkey, Newberry Professor Emeritus of Geology at Columbia University, was awarded the first Kemp Medal at a testimonial dinner on Oct. 26, for distinguished service in geology. The award was established a year ago in honor of the late **James Furman Kemp,** founder of the geology department and a pioneer in the field of engineering geology.

J. V. Rogers, former superintendent of construction and maintenance, Trail area of the Consolidated Mining & Smelting Company of Canada, Ltd., has been appointed assistant chief engineer.

K. C. Brownell, executive vice president, and **R. F. Goodwin,** vice president in charge of mining, of American Smelting & Refining Co., recently spent five weeks in Australia, where they visited properties of Mt. Isa Mines, Ltd., and Big Bell Mines, Ltd. They also spent a few days at Broken Hill and the Port Pirie lead smelter.

Mason W. Rankin, geologist, American Smelting & Refining Co., has been transferred temporarily to Neptune Gold Mining Co. in Nicaragua.

Edward J. Bock, superintendent of maintenance at the plant of Monsanto Chemical Co., Columbia, Tenn., has been made manager of the installation. **Olin R. Bailey,** chief construction engineer for the company's phosphate division, has been named maintenance superintendent.

Lawrence E. Smith, geologist formerly with the U. S. Geological Survey in Utah, has joined the staff of North Range Mining Co. His work will be chiefly at the company's Iron County properties.

John E. Meyer, consultant for Abrams Aerial Survey Corp., Lansing, Mich., has arrived at Houghton to aid in setting up a course in aerial surveying for the Michigan College of Mining & Technology.

Prof. W. A. Seaman, geologist, has retired from the faculty of the Michigan College of Mining & Technology, which he joined in 1908 as an instructor in the department of geology. He now makes his home at Alpha, Mich.

Hugh F. Kendall has retired as engineer with the Minnesota Lands & Minerals Division after 30 years of service. He resides at Wolf, Minn.

Vernon C. Davis, Aurora, Minn., has represented the U. S. Bureau of Mines on the Mesabi range this season in charge of test drilling and blasting of taconite for fragmentation.

W. J. Asselstine, former minister of mines for British Columbia, has returned, after spending several years in South America, to participate in the development of several properties in the Bridge River district.

Arthur J. O'Conner, chief engineer of the Consolidated Coppermines Corp., has been appointed general superintendent. He succeeds the late **Paul K. Sirkegian.**

Robert H. Ferguson, manager of safety for Republic Steel Corp., was elected president of the American Society of Safety Engineers at the annual meeting of the society in Chicago.

Phil Lynch, retired resident manager of Phelps Dodge Corp.'s Burro Mountain branch, Tyrone, N. M., has been named manager of the Silver City General Hospital, Silver City, N. M.

J. M. Luna, a recent graduate of the New Mexico School of Mines, has been named assayer and metallurgist with the New Mexico Bureau of Mines.

Dr. Robert B. Freeman has been made chief metallurgist for Columbia Steel Co., succeeding **Gordon L. von Planck,** who has been appointed metallurgical consultant. **Thomas E. Caldwell** has succeeded Dr. Freeman as works metallurgist at Columbia's Pittsburg works and will be assisted by **H. Edward Doleman.**

Howard R. Hendricks, chief metallurgist, Shattuck Denn Mining Corp., Bisbee, Ariz., has been granted leave of absence for a trip to Australia to do special metallurgical research for the American Smelting & Refining Co. at the Mount Isa mine.

Rudolph Ekar has been appointed assistant chief engineer of the Snyder Mining Co. at Chisholm, Minn. **A. C. Borgeson** is chief engineer.

L. H. Hart, exploration engineer for American Smelting & Refining Co., and **Earshel Newman,** mining engineer, have returned to their headquarters in Salt Lake City from Bolivia where they made a mine examination. **L. P. Entwistle,** geologist, American Smelting & Refining Co., formerly stationed at Silver City, N. M., is temporarily engaged at Corocoro mine, Bolivia.

OBITUARIES

Llewellyn D. Davenport, mining engineer, died October 10 following a long illness. At one time he served as chief mining engineer on the Mesabi range, Minn., for Oliver Iron Mining Co., and during World War II was decorated by the Navy for engineering services. He was 63.

Jacob Daniel Smuts, son of Field Marshal Jan Christian Smuts and manager of the Welgedacht Exploration Co., died Oct. 10 at his home near Johannesburg, South Africa, at the age of 42. During the war he served as his father's aide de camp and prior to his enlistment as a private he was underground manager of one of the Rand mines.

Albert Doerr died Oct. 19 in a Los Angeles, Calif., hospital after a long illness. He was 77. In 1896 he organized the Aguascalientes Metal Co. and later became associated with the American Smelting & Refining Co.'s Mexican units.

Dr. Frederick G. Cottrell, 71, inventor of the precipitator that bears his name, died suddenly on Nov. 16 after attending a business meeting of the National Academy of Sciences at the University of California, Berkeley, Calif. Preferring to help humanity through science, Dr. Cottrell first offered his invention to the Smithsonian Institution, where it was declined. However, it was suggested that a stock company be organized to take over the title to the patents. This recommendation was carried out and in 1912, in New York, a group of industrialists, engineers and scientists organized the Research Corp. to develop the invention. He reserved the right for the Western Precipitation Co., of Los Angeles, to make the precipitators to serve a limited area. The Research Corp. has made grants totaling $3,500,000 for scientific research by educational institutions. Dr. Cottrell in recent years made his home in Palo Alto, Calif.

George F. Mihm, geologist for Compañia Minera de Peñoles, S. A., Mexican subsidiary of the American Metal Co., Ltd., died in Durango, Mex., Sept. 9. He was 33.

Frank Carey, 70, formerly treasurer of the Madison County Mining Association, died at Virginia City, Mont., Sept. 26.

George W. Metcalfe, retired mining and metallurgical engineer, died re-

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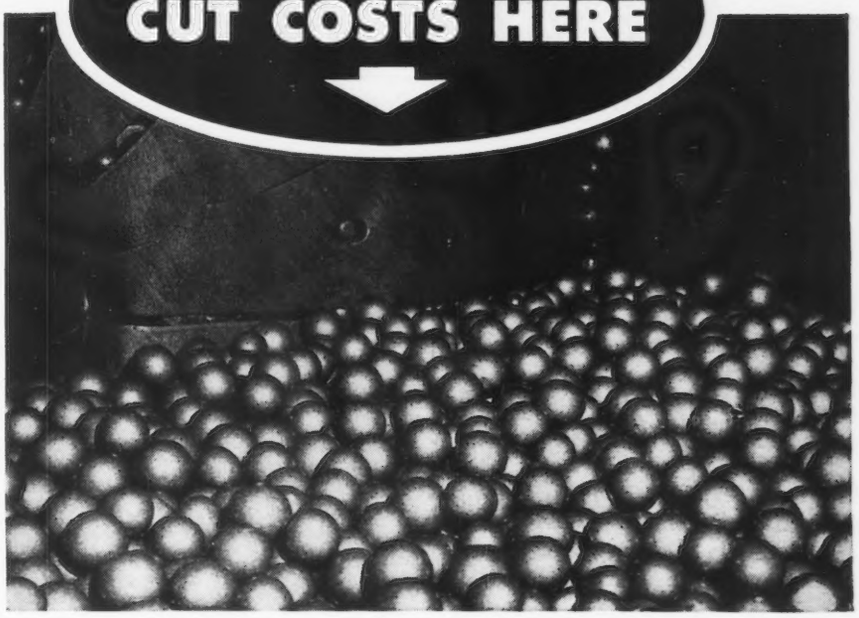

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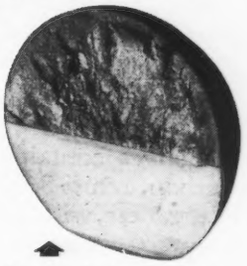

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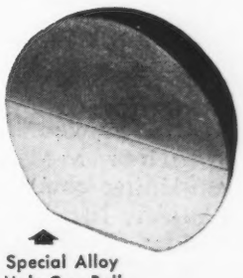

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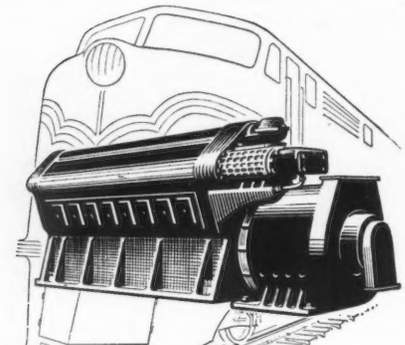

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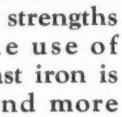

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cently at his home in Massachusetts. He was at one time associated with Anaconda Copper Mining Co. and was a member of the AIME.

Matthew Morgan Reese, mining engineer and pioneer in the Coeur d'Alenes, died Oct. 15 at Seattle, at the age of 71. He was employed at one time at the Sunshine mine in Idaho.

James R. Hubbard, former mining engineer with the Liberty Bell Mine Co., Colorado, and the Florence Goldfield Co., Goldfield, Nev., died Oct. 18 in Tucson, Ariz. He was 72.

LETTERS

Metals From Abroad

The Editor:

Two articles in your issue of September, 1948, rouse thoughts in the mind of a foreigner which may be of particular interest to your readers at this time.

On page 67 your leading editorial introduces an article by Tom Falco. This is to show what foreign countries can do to help the United States get some of the critical materials (metals) it needs.

On page 69 Worthen Bradley makes a plea for higher duties on metals. By following Mr. Bradley's line of thought, the producer in the United States would receive, say, 23c. per pound for copper; the foreign producer would receive, say, 19c. per pound. This same foreign producer would then buy back his copper in the form of electric motors at $1 per pound.

This is undoubtedly helpful to the domestic miner but the price to be paid for it is large. The price is the confidence and respect of the foreigner in getting a square deal. This confidence is worth a great deal and will some day be essential. It can only be built up over a long period of fair dealing.

The frantic outpouring of money in Latin American countries during the war to "cultivate good will" suddenly and deliberately was a poor makeshift. It smacked of plain purchase. You cannot buy that commodity, you must develop it.

Should a policy of allowing free entry of metals and minerals into the United States cause a decrease of new development, three main groups will be affected:

1. Financial. Their remedy is to invest in the mining industry of the countries which can produce without artificial subsidies.

2. Engineers. American engineers have consistently followed American financial interests abroad and have been welcome additions to countries where they lived.

3. Labor. American labor has already indicated that it would much prefer to work in a factory making an electric motor than underground in a copper mine.

It is true that the United States would be strong in war if every necessary mineral were produced within its borders. I believe however that a stronger position can be built up by allowing other countries to share this burden. The goodwill of the world at large is of more benefit than a few marginal orebodies.

To supply primary materials to the United States for less than they can be produced in that country and then to purchase manufactured end products from the United States is more than most countries will do happily.

C. M. BECK

Wawa, Ontario

Drills in Grootvlei 45 Haulageway

The Editor:

I have read with considerable interest the article "Driving the Grootvlei 45 Haulageway" in the October number of the Journal.

The article was written around the performance of the Eimco loader, but reference is made to the rock drills used. It is obvious to anybody who knows anything about tunneling that while loading machines are important, the rock drills used are equally, if not more, important.

That the drills performed well is quite clear from the article, not only because of the high rate of drilling speed obtained, but also from the freedom from broken parts.

It is impossible from the article to discover what make of rock drill was used, as this has simply been called a Leyner. Mr. George Leyner died on Aug. 5, 1920, so it is clear he had nothing to do with it, except in so far that the drills were similar to the general design which he developed 40 years ago. It should, however, be noted that the design has been modified in the intervening years, and that, if the Leyner patents were in force today, the machines which performed this record would not infringe them.

I would suggest that in authoritative articles of the kind under review, honor should be paid where honor is due. The rock drills used by Grootvlei in making this and the previous record were Holman S. L. 280 drifters.

A. T. HOLMAN

Camborne, England

Venture Capital for Mining

The Editor:

There is a feature of our mining industry which rarely suggests itself to those actively participating in the industry, not to mention the public, at large, but which has a most important effect on our national economy. That feature is the business created by mine production. We are sensitive to the supply of, and the demand for, the metals themselves, to the shortage of steel for new automobiles, to excessive stocks of silver in the Treasury, but the impact of the variations involved on our industrial payrolls

and factory production is only vaguely appreciated.

We might well study the policy of the English in this respect. Back in the 'Seventies they determined, after lengthy conferences on the part of Empire officials, bankers and mining engineers, to support the development of mining in their colonies especially, and outside of them when desirable, for the business it created for England's shops and ships.

Earnings and dividends, were necessary as evidences of continuity, but the shops and ships were, and still are, the real background of this policy.

The supremacy of England in the gold mining industry in the Transvaal, in Canada, Australia, New Zealand, India and elsewhere (even the St. John del Rey enterprise in Brazil is English-owned), bears witness to their practical wisdom. Of the $400,000,000 annual gold production of South Africa not over $40,000,000 is distributed in dividends, but fully $200,000,000 goes to England's shops, ships and "services."

The late Prof. Kemmerer used to say: "An ounce of gold, worth $35, rolls over a hundred times, from its source to its resting place at Fort Knox. Every time it rolls it creates 35 cents worth of new business and when it stops rolling it is still worth $35." That is, perhaps, one of the reasons the English favor gold mining. The other metals (except silver) lose their identity and their prices fluctuate.

I recall an incident of my early days: In 1895 I was employed by Exploration Co., Ltd., the mining subsidiary of the Rothschild group, which had just taken over the Lake George property in Australia. I was instructed to arrange for the purchase of its full equipment, from the mine pumps to the flag pole at the manager's residence. When I submitted the 10-page schedule to the directors, the chairman turned to me and said: "Mr. Atwater, all these orders are for American-made goods. That will never do!" I countered, saying the American designs were better, the prices lower and the shipments quicker. "Never mind that," he said, "you must remember that we go mining for the business it gives our shops and ships." I revised the list.

A year later, the same gentleman told me that a group of English mining investors had completed the purchase of the Fraser & Chalmers company from its American owners, with its machinery, patterns, designs and good-will and were moving it over to Erith, on the Thames, below London. There it has functioned ever since. He said my list of American equipment for Lake George was the inspiration of that transaction; that his associates were impressed with the desirability of being able to supply their enterprises with the best types of equipment but that it must be of English manufacture. He even invited me to become a director of the

(*Continued on page* 154)

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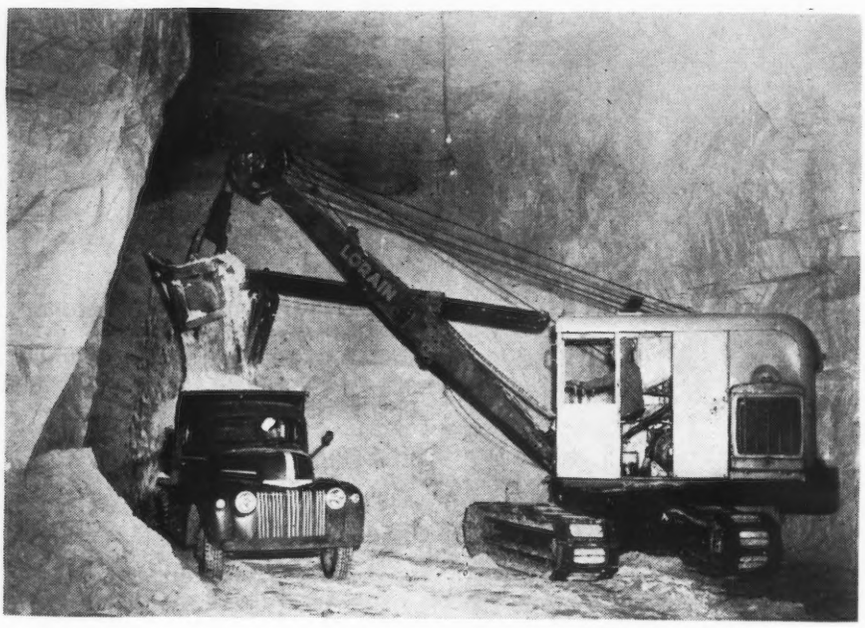
REGIONAL NEWS



MINING OPERATIONS a quarter-mile underground at the Silica Products Co., Inc., at Guion, Arkansas, cover 30 acres of tunnels. Non-poisonous nature of the fumes from the shovel's diesel engine permits the underground work. (Photo courtesy Thew Shovel Co.)

ARKANSAS

★Plans are being made to reclaim limestone deposits from Brown Mud Lake for agricultural purposes, according to the manager of Reynolds Metals Co.'s Hurricane Creek plant. This artificial lake, covering 115 acres, is used by the Reynolds company as a reservoir to provide circulation of about 1,500 gpm. of water used in processing aluminum ore. A large part of the refuse going into Brown Mud Lake is derived from the 375,000 tons of limestone used yearly in the refining process.

The lime deposits in the lake are reported equivalent to limestone having 89% calcium carbonate. The Agricultural Adjustment Administration in Washington has examined samples and given verbal approval. Victor H. Ledbetter, Reynolds chemist, described the mud as a "synthetic di-calcium silicate with minor percentages of iron, titania, alumina and soda." He stated that while a natural silicate would not react with the soil, the brown mud, being synthetic, produced an immediate reaction.

TENNESSEE

★The fifth electric furnace at the Monsanto Chemical Co. plant in Columbia was completed recently and dedicated with ceremonies at the plant on Oct. 27. Approximately 65 representatives of the Monsanto company, other industries, and the press were on hand for the occasion. The new furnace makes Monsanto Chemical Co. the largest producer of elemental phosphorus in the world. Employment at the Columbia plant, now totaling 550, is expected to increase by about 15%.

NORTH CAROLINA

★Passing on a case in which a mining firm had appealed, the North Carolina State Supreme Court on October 20 affirmed an order holding that a workman who is incapacitated by silicosis is entitled to full compensation under the state workmen's compensation act.

The case had been appealed from Mitchell County Superior Court which had directed the Mitchell Co., Inc., operator of a feldspar mine, and its insurance agency to pay Jess Young, a worker, a total of $841.

The State Industrial Commission previously had ruled that Young, discharged in May, 1946, because of sickness resulting from silicosis, was not entitled to benefits under the workmen's compensation act but admitted his health was impaired to the extent that he would not be able to hold another mining job. This ruling was set aside by the Mitchell County Court.

★J. A. Reinemund of the U. S. Geological Survey recently lead a group of North and South Carolina geologists, members of the Carolina Geological Society, on a field trip through the Deep River coal basin and the pyrophyllite mine in the Sanford-Jonesboro, N. C., area.

MICHIGAN

Calumet & Hecla produce oxychloride sulphate—First copper taken out at Ripley smelter

★Calumet & Hecla has started a "timber farm" on a 4,400-acre tract south of Portage Lake. The program provides for continuous harvesting. The plan is to divide the tract into five parcels of 880 acres each. One of these tracts will be cut on a selective basis each year for the next five years. This cut will remove those trees which have reached the limit of growth. About 40% of the timber will be removed on the first cut.

After the harvest has been completed, another cycle of cutting will follow, at which time only mature trees will again be removed. After the second cycle, only the amount of the annual growth will be removed each year.

This stand of timber serves an additional purpose as an outdoor laboratory for the forestry school of the Michigan College of Mining and Technology. Cruising and marking of trees to be cut in the first section were completed by the school during the past summer.

★Seneca No. 2 shaft of Calumet & Hecla has been holed through to meet the raise from the 33rd level north of Ahmeek No. 4 shaft. Shaft and raise met exactly, vertically and horizontally. Work was started on the raise on the 33rd level in March, 1947. At the same time the 30th level north of Ahmeek No. 4 was extended to cut the line of the raise, and work was started in No. 2 Seneca shaft. The shaft had to be filled from the 20th to the 25th level to line it up, and had to be timbered. Shaft sinking followed to meet the raise. The total length of raising and sinking was 2,050 ft. The raise accounted for 1,750 ft. and sinking 300 ft.

★Calumet & Hecla resumed the production of oxychloride sulphate (C-O-C-S) Oct. 11. The plant will be operated continuously until July 1,

1949. The agricultural market is seasonable, and in most areas copper fungicides are not used during the fall months. Carload shipments were started late in October. Several months will be required to provide sufficient stocks for the California and Florida markets. The plant is scheduled to produce approximately 2 million pounds of C-O-C-S during the 1948-49 season.

★The Quincy Mining Co.'s smelter at Ripley, idle for many years, is again in commission. The first copper was taken out on Oct. 15, coming from a new reverberatory. The initial charge amounted to 40,000 lb. Furnace charging is done with a Peabody-Mulliken loader. Besides smelting the product of its reclamation plant at Mason, the company may do some custom work. The original buildings of the smelter were put up 50 years ago.

KENTUCKY-ILLINOIS

Alcoa to sink shaft on zinc orebody at Hutson—Crystal Fluorspar purchases separation plant

★Discovery by diamond drilling of a new zinc orebody at the Hutson mine in Livingston County, southwest of Salem, Ky., is the most important development in recent months in the Kentucky-Illinois mining district. The ore will average 28% zinc.

Alcoa Mining Co., which acquired the Hutson in the purchase of properties of the Eagle Fluorspar Co., will start immediately to sink a 600-ft. shaft, according to Walter S. Skeels, Alcoa works manager. Construction of a flotation mill of 100-ton daily capacity is planned. Other surface buildings will be erected during the next few months.

★Alcoa Mining Co. also has purchased the Klondike fluorspar mine, in Livingston County, northeast of Smithland, from the Salem Fluorspar Co., but does not plan operation of the mine at present.

★Ozark-Mahoning Co. is sinking a new 400-ft. shaft on its Green property in the Cave-in-Rock fluorspar district, Hardin County, Illinois.

★Inland Steel Co. has installed conveyor barge-loading equipment on the Kentucky side of the Ohio River, opposite Elizabethtown, Ill. Fluorspar ore hauled from the company's Keystone mine is loaded for river shipment.

★Crystal Fluorspar Co., operating in the Cave-in-Rock district, has recently purchased a new mobile Heavy Media separation plant, and plans installation as soon as preliminary preparations are complete. Crystal is the latest among a number of operators in the Kentucky-Illinois fluorspar district to install sink-float plants.

IRON COUNTRY

Season's shipments to Nov. 1 exceed last year's by 4¼ million tons—Life of Hill-Annex pit extended

★Pickands, Mather & Co. have completed shipments for the season from the Danube mine at Bovey. The mine is to be converted from rail to truck haulage before next season.

★Shipments of concentrates from Mesabi washing plants are practically completed after a fall of favorable weather with but few days with temperatures below freezing. The railroads usually do not furnish cars to a mine at this season until the boats for carrying it have been reported. As it is, unless the weather becomes very cold, shipments of direct-shipping ore are likely to continue up until December.

Steaming of ore cars to thaw them was made necessary by freezing temperatures for 24 hours on Oct. 17-18 at Proctor and Two Harbors, Minn., for the Duluth, Missabe & Iron Range Ry. and at Superior, Wis., for the Great Northern Ry.

★John H. Hearding, district superintendent for Oliver Iron Mining Co. at Hibbing, has informed the clerk of the village of Buhl that the lots owned by the Oliver company in Buhl have been authorized for sale. As is the company's custom, employees will be given the first chance to buy them.

★A proposed amendment to the Minnesota constitution in respect to taconite taxation that would require a two-thirds vote of the legislature for acceptance has been endorsed by the northeastern Minnesota rehabilitation committee, Hibbing Junior Chamber of Commerce. Its purpose is to assure companies which contemplate investing large sums in taconite experimentation and development that they may "expect some stability in the tax program for taconite and . . . selfish groups will not seek to wreck the mining program by attempting to obtain an unreasonable revenue from this new industry."

★The Inter-State Iron Co. has planned an extensive program of stripping for the Hill-Annex mine at Calumet for the coming winter. An area on the southeastern part of the present pit will be stripped and about 800,000 cu.yd. of surface material removed. This truck operation will necessitate such preparatory work as changes in roads, power lines and water lines. Some smaller areas on the north edge of the old pit, where "bulges" in the ore limits have been located, will also be stripped. The dirt will be moved by railroad as the old approach tracks can still be used.

This expansion of the pit limits follows arrangement for extending the state lease on the property to permit

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Iron Country *(Continued)*

mining material heretofore considered too low in grade to be beneficial in a straight washing plant. Some changes in the present plant will be needed for handling the additional tonnage.

★Inter-State Iron Co.'s Grant mine at Buhl has added a second 15-ton Mack truck. The truck has a 13-cu.yd. Heil scoop-end dump box and is now powered with a 300-hp. Hall Scott motor.

★At Butler Brothers' South Agnew mine near Hibbing, 769,349 cu.yd. of stripping was moved in September. Of this 657,309 cu. yd. was handled by the Bucyrus-Erie 1150-B dragline. The machine's 24-hour average during the month was 24,432 cu.yd.

Butler Brothers produced 580,594 tons of ore during September.

★Season shipments from Upper Lake ports up to Nov. 1 totaled 74,152,539 gross tons of iron ore. This was 4,229,686 tons more than the corresponding 1947 figure.

★Frank J. Carlson, mine inspector of Iron County, Mich., reports that 1,729 men were employed at the iron mines of the county during the past year. Three fatal accidents occurred during the year ended Sept. 1.

★Edward Meyer Construction Co., Oshkosh, Wis., is erecting the steel for the new research laboratory of Cleveland Cliffs Iron Co. at Ishpeming, Mich. Methods will be studied for treating the low-grade ores of which the company has a large tonnage on the Marquette range.

★M. L. Jacobs, vice president of Bethlehem Steel Corp., Joseph Bellar, vice president of Youngstown Sheet & Tube Co.; Elton Hoyt, II., Herbert F. Jackson and Howard Prescott, partners in Pickands, Mather & Co.; Alex D. Chisholm, Duluth, partner and general manager of the company; Kenneth Duncan, Duluth, assistant general manager, and Dr. Scofield, Duluth, geologist, inspected the Buck, James and Davidson mines of the Iron River district. They were accompanied by H. J. Richards, general superintendent; Stephen Royce, chief geologist; Wayne E. Seppanen, chief engineer of the district; A. L. Johnson, underground superintendent, and Steve Fodor, master mechanic.

★A new sinking record was hung up for October at the Mather "B" shaft of Cleveland-Cliffs Iron Co. at Negaunee, Mich., on the Marquette Range. The footage made was 170 ft. The previous record was scored last spring when 142 ft. was completed. At that time the shaft was 800 ft. deep. Today it is 1,700 ft. Two changes are credited for the improvement. By adopting the bits with tungsten-carbide inserts the drilling cycle was reduced from 4½ to 1½ hours. An even larger saving was made by removing the broken rock from the shaft with a ⅜-cu.yd. clam-shell (instead of hand

shovels) operated from 40 ft. above by hydraulic pumps at 5,000 p.s.i. through ¾-in. hose. At such pressure, the power unit comprising pumps, tank, and valves is light and can easily be moved in the shaft. If the bucket is hung at the center of the shaft it can easily be swung by hand to any point on the rock pile and loaded quickly.

Time is saved in the corners by loading the bucket in one corner and dumping it in a tray as it swings past the center and letting it swing under its own momentum to the opposite corner for the next load. Thus it swings back and forth, reducing the manual effort required to move it. This equipment was developed at the mine from a hydro-shovel as now built by Bucyrus-Erie Co. and operated by cylinders using oil at 5,000 p.s.i. When mucking was done by hand 16 men were used. With the clamshell only six men were required. J. A. Westwater is superintendent.

★The Warner mine, near Amasa, Mich., on the Menominee range, has been acquired by North Range Mining Co. Development will be delayed unless heavy rains arrive in the near future to remedy the power shortage. This mine was opened in 1916 and sunk to 1,500 ft. by Hemlock Mining Co., a subsidiary of Pickands, Mather & Co. Over 2,000,000 tons was taken out but it has been idle for many years, with all equipment removed from surface. R. S. Archibald is manager of North Range.

★The North Range company has also leased lands adjoining the Warner and expects to begin unwatering its 1239-ft. workings soon. The Champion mine, on the Marquette range, which North Range is also pumping out, is expected to re-enter the shipping list in 1949.

★At the Vicar mine, Wakefield, Mich., on the Gogebic range, Jones and Laughlin Co. has completed shaft sinking at 610-ft. depth and has made cut-outs for two levels at 465 ft. and 561 ft. below the collar. The mine buildings, constructed by McDonald and Kaake of Marquette, Mich., are completed and in use. At the Morgan shaft, a short distance from the Vicar, a Quonset-type building is being erected for a hoist house. H. S. Peterson is district superintendent, with headquarters at Ishpeming.

TRI-STATE

★The Eagle-Picher Mining & Smelting Co. advanced its contract settling basis for galena to $286.17 per ton on November 1, following the 2c. per lb. increase in the price of pig lead. Producers are to obtain a premium of $6 per ton above the metal contract basis, which brings the price realized under prevailing conditions to $292.17

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Tri-State *(Continued)*

per ton. The regular smelting charge was unchanged at $20.55 per ton. The metal contract base price is figured on the St. Louis pig lead quotation on the basis of 90% recovery of metal from a ton of 80% concentrate.

To what extent production of zinc and lead concentrates will be stimulated by higher prices remains to be seen. Unless costs rise again, higher prices should result in some improvement in output.

Zinc concentrate was unchanged last week on the basis of $98 per ton for prime and flotation, basis 60% zinc.

Following the increase in price of zinc to 15½c., Eagle-Picher established its Central Mill base settlement price on zinc concentrates at $98 per ton effective Oct. 23. Ore producers estimated that it should have been established at $103.85 per ton on the basis of the old ratio of 6.7 times the E&MJ average East St. Louis quotation.

ARIZONA

Mining men protest AEC price on uranium—San Manuel shaft down to 72 ft., headframe nearly complete

★Charles H. Dunning, director of the Arizona State Department of Mineral Resources, recently delivered samples of Arizona uranium ore to the Bureau of Mines at Tucson for analysis. The pitchblende-base ore is from the Hack's Canyon deposit in northwestern Arizona and efforts will be made to develop a method of concentrating the ore to qualify for a $10,000 Atomic Energy Commission award.

★The Bureau of Indian Affairs has been advised by the Atomic Energy Commission that the Navajo Tribal Council will receive from $50,000 to $100,000 annually from royalties on uranium. The Vanadium Corporation of America is to exploit the known uranium deposits under lease. Most of the uranium from the Navajo reservation will be processed at the Durango, Colo., plant, also leased to the Vanadium Corporation of America, officials said.

★The Arizona mine production of gold, silver, lead and zinc for the first six months of 1948, and percentage increase or decrease over 1947, are shown in the following table released by the Arizona Department of Mineral Resources:

	Gold (Oz.)	Silver (Oz.)	Copper (Oz.)	Lead (Tons)	Zinc (Tons)
1947 Mo. Av.	7,750	358,333	30,518	2,292	4,408
1948 Mo. Av.	8,736	390,139	31,032	2,335	4,117
(1st 6 mo.)	+12.7%	+8.88%	+1.68%	+1.84%	—6.60%

★Reports from Kingman state that a mill will be installed at the Boriana mine of the Omega Mining Co. to handle the Copper World copper-zinc ore. The mill will also take care of 100,000 tons of dump ore from the Boriana containing tungsten, zinc and copper.

★Leasers on the Hidden Treasure mine, two miles southeast of Chloride, are finding high-grade lead, gold, silver ore in old workings which were opened 70 years ago, reports from that section indicate.

★Continued progress in the development of the San Manuel copper deposit is reported by W. P. Goss, general manager of Magma Copper Co. and the subsidiary San Manuel Copper Corp. The No. 1 shaft in the new orebody has been reinforced with a 50-ft. concrete collar and is sunk to 72 ft. Erection of the sinking hoist and headframe is nearly complete.

★Santa Maria Mines, an exploration group seeking to find an extension of the San Manuel ore, has sunk its first exploratory churn drill hole below 1,000 ft. The corings are reported to have shown copper in commercial quantities and a second drill test is under way.

★The Orizaba mine in Black Canyon is shipping approximately 10,000 tons of ore monthly in developing the property. Values are in copper, gold and silver.

★The Indiana-Arizona Mining Co. is shipping 150 tons of lead-copper ore with silver values from the 400-ft. level of its property near Marana.

★The Golden Door mine of the Arizona Gold and Silver Mines Co., Mohave County, will mine a shoot of high-grade gold ore recently uncovered by the leasers. The mine was producing 100 tons daily before the war, when operations were closed. W. P. Sellers, Jr. is mine superintendent.

★The Silver Knight mine in the Bradshaw mountains, near Prescott, has been making small shipments of galena ore containing gold to the Shattuck Denn mill at Humboldt.

★The Interstate Commerce Commission recently handed down a decision upholding a state corporation commission suspension of a new railroad tariff on intrastate shipments of ores and concentrates. The tariffs were published last spring by the Southern Pacific and Santa Fe Railroads and were protested as unjust and discriminatory by the Arizona Small Mine Operators Association and others.

★Western Arizona Metals Co., work-

ing a lead mine in Maricopa County has sunk a development shaft 125 ft. into the orebody and recently took out a 36-in. block 18 in. through which was pure galena and weighed 1,650 lb. High-grade ore mined during shaft sinking operations has run between $400 and $500 a ton with a shipping grade of $80 a ton. Owners of the company are officials of the Magnolia Iron Works of N. Hollywood, Calif., headed by Edward T. Webb. They plan to erect a small pilot mill at the plant site which will be used to work out a flowsheet for a 500-ton daily capacity plant.

★Uranium mining activity in the Four Corners area where Arizona, Colorado, Utah and New Mexico join, has been sharply curtailed in recent months, with mining men blaming the government for lack of a fair price. Government figures show a drop from 5,000 to 1,000 tons in three months at the government sampling plant at Monticello, N. M. Under the present price basing system, U_3O_8 is bringing only half of what it did in 1918 while mining costs have more than tripled, according to mining operators of the area.

NEW MEXICO

State inspector reports year's mineral production—Miners' association purchases Geiger counter

★Production of all mines in New Mexico during the fiscal year ending June 30 totaled $92,693,429, according to the annual report of John A. Garcia, state inspector of mines. This was an increase of $17,533,197 over production in the 1946-47 fiscal year.

Value of non-coal production was $85,981,365. Eddy County, with its large potash mines, led all counties in total production and in non-metallic production, with a value of production of $42,738,880. Grant County was the leader in metallic production, with a value of $38,792,425.

Garcia estimated New Mexico mines spent $3,080,258 during the year on new buildings and equipment, exclusive of amounts spent for additional ventilating and escape shafts for mines. The state's mining industry employed 6,700 persons in Sept., 1948, according to a report by the State Employment Security Commission.

★A strike of 30 mine workers at the Phelps Dodge Corp. mine at Tyrone which started Aug. 12 ended Oct. 13. The company granted a wage increase of 12c. an hour. The new contract is to run for two years, but contains a clause providing that wage negotiations may be reopened in one year.

★H. E. McCray of Deming, who operated the Burro Chief fluorspar mine at Tyrone for a number of years, has leased two fluorspar properties

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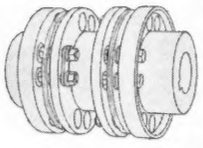

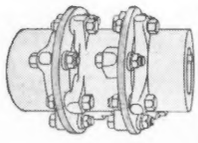

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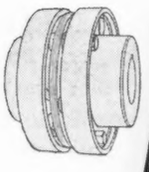

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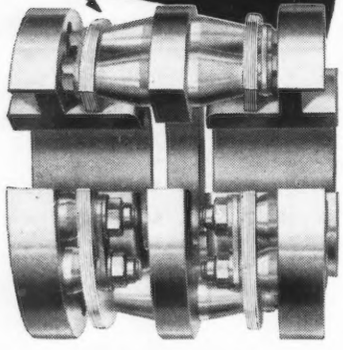

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New Mexico *(Continued)*

in the Cook's Peak Mining District north of Deming in Luna County. One is the Greenleaf Group, leased from the Greenleaf Corp. McCray has been developing this property for several months and has extended the incline shaft from the 400-ft. level about 50 ft., where he encountered additional fluorspar ore.

★The New Mexico Miners and Prospectors Association has purchased a portable Geiger-Muller counter for use in prospecting for deposits and identification of radioactive minerals. It will be available for use by association members for a small charge. The New Mexico Bureau of Mines has plans for purchase of a similar counter.

NEVADA

Combined Metals Reduction Co. to enlarge flotation mill — Newmont completes mill at Goldfield

★Combined Metals Reduction Co. at Pioche, Lincoln County, is planning enlargement of its selective flotation mill, to bring the plant's capacity up to 1,200 tons per day, it has been stated by Samuel S. Arentz, general superintendent at the company's Caselton mine and mill. Mr. Arentz also reported 100 or more miners would be added to the working force.

The company is developing another lead-zinc silver mine at Comet, in the same county, and shipping concentrates by rail to its smelter at Bauer, Utah. Perlite is being mined from two nearby properties and processed at the Bauer plant. Power is supplied by a line to Pioche from Hoover Dam.

★Newmont Mining Corp. has completed construction of the 120-ton flotation mill at Goldfield. A small quantity of low-grade ore has been crushed, but plant operation has been delayed by water shortage. Water piped from the old Laguna and Clermont shafts was found to be unsuitable for milling. Mill equipment was trucked from a Newmont plant at Grass Valley, Calif.

From the nearby Florence shaft, on the 380-ft. level, a crosscut has been driven west through claims of the Goldfield Cons. Mines Co. to connect with a shaft on the little-developed Whiterock claim. Ore in the form of a stockwork and some narrow seams of high-grade gold ore were found here. Some 3,000 tons had been hoisted through the Florence shaft and stockpiled near that point before the mill was completed.

★Cordero Mining Co., one of the foremost U. S. quicksilver producers during the war years, has not resumed operation of its 80-ton furnace plant in northern Humboldt County, damaged by fire early this year. A small mine force has been retained and cinnabar of good furnace grade has been mined to a depth of 650 ft.

COLORADO

Atomic Research Corp. to open laboratory—Golden Queen company developing in Powderhorn district

★Max Bowen, vice president of the Golden Cycle Corp., and general manager of the mill in Colorado Springs, has returned from a trip to Canada where he studied milling practice on gold ore similar to that of the Cripple Creek area. Officials of Golden Cycle hope construction of the company's gold ore reduction mill to be built in the Cripple Creek district will be started within the near future.

★National Grinding Corp. has secured a $3,000 permit from the city to erect a mica mill at Grand Junction. The plant will handle mica produced from mines being developed between that city and Glade Park.

★W. M. Muchow, president, Chain-O-Mines Operators, Inc., recently reported that construction of the 6,000-ton mill in Gilpin County was underway, with the first unit nearly complete. High-grade ore was being developed in the upper, or 300-ft., level of the crater, or glory hole. The ore was to be moved by belt-conveyor system.

★Independent vanadium producers of western Colorado gathered in Grand Junction recently to meet with representatives of the Atomic Energy Commission in an effort to secure more equitable prices for the carnotite ores of this region. Philip Leahy, representative of the Atomic Energy Commission, promised that the final recommendations would be forwarded to the Atomic Energy Commission in Washington. The producers contend that the spread of prices between amount paid for ore and the amount paid by the government to Vanadium Corporation of America for the finished product is too great.

★According to Roy Knowles, president, the Gold Queen Mining Co. is developing the May Queen and El Paso mines in the Powderhorn district, Gunnison County, where a large deposit of lead, copper, silver and gold ore has been opened. Hoists, compressors and other machinery are being installed. The company has also been sinking a new shaft at the Lucky Strike gold mine six miles south.

★The Rosebud tunnel being driven by Gold Empire, Inc. into Rosebud Hill from Gold Gulch is gaining depth and nearing the Mary Nevin vein, according to the management. When the vein has been intersected the tunnel

will follow the vein in search of the intersection of the Mary Nevin with the CK&N vein, which produced rich ore in the adjoining Henry Adney mine.

★James Cameron of the British geological survey, Dr. E. Franklin of British telecommunications laboratory, Dr. W. F. James, adviser to Canadian atomic control board, and Dr. A. H. Long, Canadian geological survey, have made a tour of the Colorado plateau area to observe the geology of vanadium-uranium ore occurrences and exploration techniques.

★Corporation papers for Atomic Research Corp. were filed with the Colorado secretary of state at Denver. The new concern announced it was opening a research laboratory in one of the Peterson Field buildings. One of the first research projects undertaken, will be the application of electronics to locating and extracting rare metals and minerals.

★Tell Ertl, representing Union Oil Co. of Rifle, reveals that a 50-ton per day continuous type retort for oil shale is being prepared by his company for shipment to Rifle. It will be used for tests to obtain data for the design of a commercial size unit.

★Report from Central City was that two pitchblende ore samples from the Russell Gulch property of the Quartz Hill Mineral Development Co. were submitted to the United States Atomic Energy Commission and that the samples under test gave values of .07% and 11% U_3O_8. The 11% sample was high also in galena.

★The report in October E&MJ that the vanadium-uranium mill at Uravan had been taken over by the Atomic Energy Commission was in error. The mill, closed down at present, is the property of the United States Vanadium Corp.

CALIFORNIA

Afterthought mine is open—Progress at Mary Len mine—New Idria quicksilver doing cleanup work

★The New Idria quicksilver mine in San Benito County closed down production Oct. 1, leaving only one substantial producer of quicksilver still in operation, the Mt. Jackson mine in Sonoma County. Cleanup work at the mine will continue until about Jan. 1 with a small crew on the property, Gordon Gould, president of the New Idria Quicksilver Mining Co., reported.

★The State Division of Mines reported that quicksilver production in California in 1947 amounted to 17,112 flasks of 76 lb. each, worth $1,386,087, from 25 properties; compared with 17,804 flasks worth $1,647,758 from 34 properties in the previous

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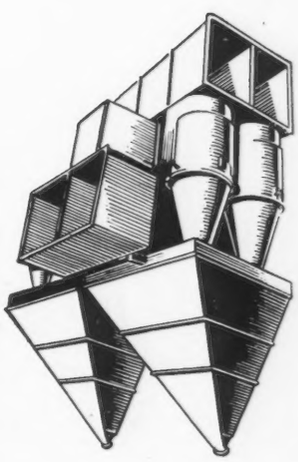

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California *(Continued)*

year. California accounted for 75% of the nation's output.

★The "Centennial" is the name chosen for the New Champion mine near West Point in Calaveras County by the present operators, M. G. O'Hanlon and M. G. O'Hanlon, Jr. The mine has operated almost continuously, on a limited scale, since 1946. It is now being developed through a 200-ft. inclined shaft and drifts along the strike. The main ore shoot has been exposed for a distance of 175 ft. Average gold recovery has been in excess of $50 per ton. Mill and hoisting equipment have been completely overhauled and considerable new equipment added.

★Perlite is being mined by the National Perlite Co. of Campbell from a new quarry face on the Holt Ranch near Rutherford in Napa County, according to the State Division of Mines. The company recently completed the necessary road construction to the deposit. Prices of the expanded perlite at plants where it is produced range from 18½c. to 33⅓c. per cu. ft. in bags.

★The Afterthought mine at Ingot has been reopened by its owner, the Coronado Copper & Zinc Co., and was scheduled for capacity operation of 100 tons daily by mid-November.

★A deposit of gold ore in the Susie Lake area is being developed by the Argyle Mining Co. Mining machinery has been installed and the construction of a flotation mill is planned on assurance of an adequate reserve.

★Ancho-Erie Mining Co. has announced discovery of a large gold vein in its mine north of Washington in Nevada County. Fred Anderson, general manager, said that ore developed so far had a minimum value of $60 a ton.

★At the Gaston mine of Tonopah Divide Mining Co. a new orebody was uncovered on the 1,100-ft. level at the end of the main working tunnel. E. L. Cleveland, Tonopah president, reported the vein shows an 8-ft. width of mill-grade ore.

★An 11c. per hour across-the-board wage increase has been granted to members of the Alkaline Salt Workers Union, local 414, (affiliate MMSW) at the Trona plant of American Potash & Chemical Corp., effective Dec. 1.

IDAHO

Nabob deep tunnel reaches Sidney vein—Red Bird mine ships lead-silver ore to Salt Lake Valley

★Nabob Mining Co.'s crosscut tunnel, the deepest in the Pine Creek area, had been completed for a distance of 6,421 ft. early last month. The Crystalite-Pittsburg structure, the first vein encountered, assayed low-grade, lead-silver values for 100 ft. in width and on the footwall of the vein developed 12 in. wide of galena ore assaying 69% lead and 12 oz. silver per ton. The company is now drifting westerly on this vein structure.

The tunnel entered the Prichard slate formation, cutting several veins containing scattered bunches of ore until it reached the main objective, the Sidney and Denver veins. The Sidney vein shows a small streak of clean galena ore and the company decided to drift easterly on this structure towards the Sidney mine workings, 600 ft. above this level, and drive short crosscuts at intervals to the Denver vein.

Nabob is equipped with a modern 300-ton flotation milling plant which is connected by surface tram to the deep tunnel portal, and the mill has been placed in condition to handle production from the drift prospecting development.

★Silver Dollar Mining Co.'s one-third interest in the "Rotbart" area being operated by Sunshine produced a net profit of $83,000 for the month of September. The ore produced milled out at 74.9 oz. silver and 5% lead per ton.

★Mine operators in the Pine Creek district have signed contracts with the U. S. Government for the stockpiling of certain tonnages of zinc concentrates, pending completion of the enlargement of capacity of the Sullivan zinc plant at Kellogg.

★Lucky Friday Silver-Lead Mining Co. has around 5,000 tons of high-grade, silver-lead ore stockpiled at the mine at Mullan awaiting treatment at the Golconda custom mill. All preliminary preparations have been made to sink the Lucky Friday main shaft from the 1,400 to the 2,000 level.

★Clayton Silver Mines, Custer County, plans to sink 100 ft. to prospect the downward extension of the oreshoot on which a large tonnage has been developed down to the 300-ft. level.

The company has recently been developing the Ella property which adjoins the Clayton. This work consisted of 1,000 ft. of prospect drift following an orebody running 3½% lead, 1½% zinc and 4 oz. silver per ton.

★Sunshine Mining Co. is opening the Yankee Girl vein system on the 2,700-ft. level. The lower level development is partially on ground owned by the Metropolitan Mining Co., and Sunshine has conveyed one-sixteenth interest in the production of the vein to the Metropolitan company and has agreed to prospect the balance of Metropolitan ground on a 50-50 basis. Sunshine is now producing from the Metropolitan section of the Yankee Girl vein on the 3,100-ft. level and up to the 2,700-ft. level and is drifting on the vein on the 3,700-ft. level

preparatory to driving a raise to connect with the 3,100-ft. level.

★The Sullivan Mining Co. reports gross sales of metals from its custom zinc smelting plant at Kellogg to be $4,065,510 for the second quarter of 1948 as against $4,112,065 for the first quarter. The addition now being built at the plant is expected to increase daily output capacity from 3,400 to 4,200 tons of refined slab zinc.

★Steel erection is nearly complete at the $4,000,000 plant being built by the Westvaco Chemical Corp. near Pocatello. According to Gilbert L. Miller, resident manager, Westvaco's initial electric furnace for reduction of Idaho phosphate into phosphorus should be operating by next April. The Union Pacific recently completed a 23-mi. spur to Simplot Co. pits to link the open pit mines with both the Westvaco plant and Simplot Fertilizer Co. superphosphate operations.

★The Red Bird mine, Custer County, was purchased from the Ford Motor Co. in 1946 by Louis Buchman, L. S. Breckon and J. A. Norden. Production was commenced in April of 1947 and has been continuous since that time. The ores, which contain oxidized lead and silver values, are trucked to Mackay, Idaho, about 70 miles and then shipped by rail to Salt Lake Valley for smelting. Mr. Norden is in direct charge of operations.

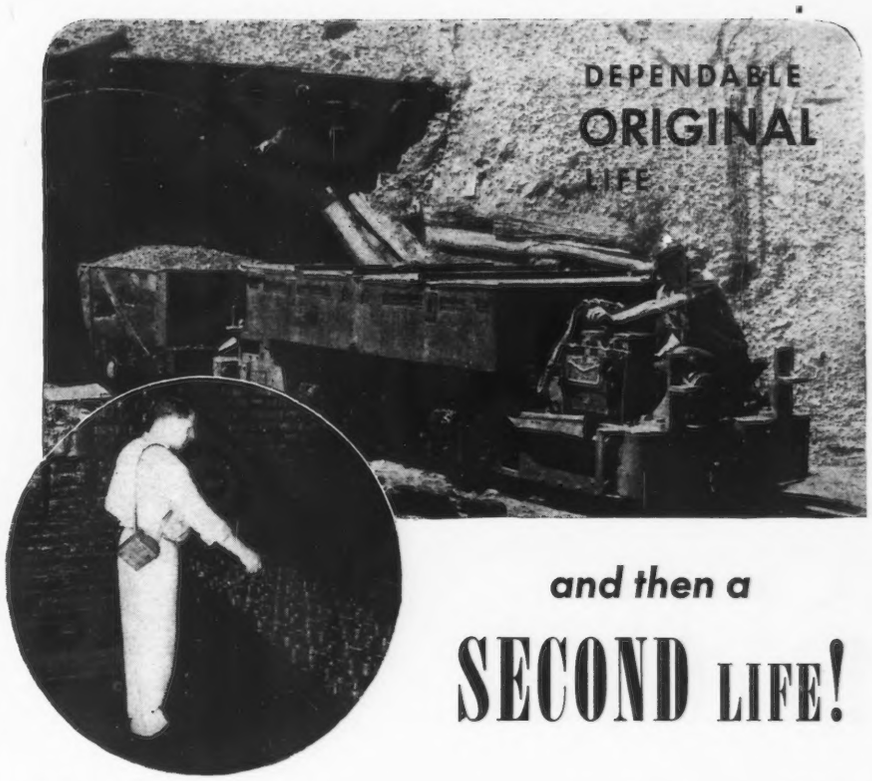
★The new mill at the Bradley Mining Co.'s Ima tungsten mine near Stibnite, replacing the plant burned out last December, was expected to be in operation by Dec. 1, Jack Bradley reported. The $150,000 structural steel replacement largely duplicates facilities at the old mill, except that a change from a ball mill to a rod mill was made to prevent overgrinding in the tungsten and improve output quality. Bradley pointed out that little improvement in quantity could be expected since the operation already had been recovering a 72% concentrate. Capacity of the mill will be 150 tons per day. The mine has been under development during the rebuilding period and substantial additions to ore reserves have been made.

UTAH

Fluorspar mining active in Juab County—New Park Mining Co. will construct employees' homes

★A "boom town" of tents and a few cabins has sprung up beside Topaz Mountain, Juab County, where sizable quantities of fluorspar are being mined by means of bulldozers and power shovels and shipped to the Geneva Steel Co. plant near Provo, and elsewhere. Carloads recently reported on were running 92-94% purity.

★Silver King Coalition Mines Co. in-



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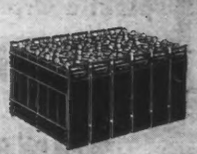

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Utah *(Continued)*

curred a net loss of $1,526 after all taxes and depreciation but before depletion, for the quarter ended Sept. 30. Net income for the year ended Sept. 30 was $134,777.

★New Park Mining Co. plans to start construction next spring on 25 homes in a projected new townsite six miles north of Heber. Employees will own their own homes, expected to be federally financed, said W. H. H. Cranmer, company president.

★MMSW lost approximately 25,000 of its membership during the recent split, Reid Robinson, vice president, said at a regional conference of his union Nov. 4 in Salt Lake City. Remaining membership now is approximately 110,000. He stated that the Democratic victory at the polls would strengthen union efforts to repeal the Taft-Hartley law, roll back prices and foster federal housing, all of which would tend to increase membership.

★Silver Standard Mining Co. has spent $30,000 in development work since acquiring the old Lakes of Killarney mine in the Ophir district in 1946, Dr. L. N. Ellsworth, president, announces.

OREGON

Oregon men to produce industrial minerals on custom basis—Dant & Russell plant will move to Frieda

★Dant & Russell, Inc., of Portland has announced plans for moving its perlite processing plant from St. Helens to Frieda, on the west bank of the Deschutes River. This will be added to new facilities now under construction there. The enlarged plant, which will double the present output of "popped" perlite, is expected to cost $1 million, and to be in operation by next June.

★Waite Minerals, Inc., recently organized company which acquired the Queen of Bronze and Cowboy mines in southern Josephine County, has made the first shipment of ore from that area in more than 20 years. A carload of copper ore from the old dump of the Queen of Bronze was sent to the Tacoma smelter.

★A new block of gold-silver-lead ore has been opened up on the 400-ft. level of the Buffalo mine in eastern Grant County. As a result the flotation mill at the mine is being operated one shift a day. Concentrates are shipped to the Midvale smelter.

★The Horseshoe Lime Co. is installing new equipment in its plant near Williams, Josephine County, but completion of the work has been delayed until next spring after the rainy season.

★The Greenhorn Mining Corp. has been formed for working a gold lode in Jackson County, formerly known as the Miller mine. Officers of the company are Fred Haley, president; Tom Cudd, vice president, and W. E. Keister, secretary-treasurer, all from Grants Pass.

★James M. Orr and E. C. Boyd, Portland mining and chemical engineers, have leased the Harris sulphur grinding plant at Portland to produce mineral diluents and industrial minerals on a custom basis.

★Brockton Nevada Mining Syndicate will operate the gold dredge acquired from L. R. Harris which has been idle since before the war.

★Calhoun & Howell were using a new washing plant and a dragline with a 3½-cu. yd. bucket on the North Fork of John Day this season.

MONTANA

Committees will compile inventory of Montana's resources—Helena men developing Eldorado claim

★The Montana Chamber of Commerce has instigated appointment of nine "task forces," to compile an up-to-date inventory of industrial resources in the state, after contacting the National Munitions Board and National Security Research Board. Organizers of the survey met in Butte on October 15 and 16 and were addressed by Captain R. O. Watt, USN, Washington, D. C., representing Secretary of Defense Forrestal and the Munitions Board; W. R. Devlin, Washington, D. C., representing Commerce Secretary Sawyer; Robert E. Towle, manager of the Helena branch of the Federal Reserve Bank and chairman of the industrial division of the Montana Chamber of Commerce; Gerald Skibbins, Helena, consultant of the industrial division, and J. J. Flaherty, Great Falls, president of the State Chamber.

The mining and smelting "task force" consists of Carl J. Trauerman, Butte, chairman; A. V. Taylor, Jr., Philipsburg, president of the Mining Association of Montana and the Taylor-Knapp Co.; Dr. F. A. Thomson, Butte, president of the Montana School of Mines and chairman of the executive committee of the Mining Association; Kuno Doerr, Jr., manager of the East Helena plant of the A. S. & R. Co., and F. A. Linforth, Butte, executive assistant, Anaconda Copper Mining Co. Earl S. Bardwell, consultant of the Great Falls smelter of the Anaconda Copper Mining Co., is chairman of the chemical industries committee.

★Tunnel and raise developments are being carried on to develop copper, gold and silver ore in the Eldorado

claim in the Marysville mining district, by a group of Helena men.

WASHINGTON

Spokane Molybdenum develops Lincoln County property—Glacier Silver-Lead organizes new company

★Slate Creek Mining Co. plans to keep a 15-man exploratory crew at its property in eastern Whatcom County through the winter, according to Harry P. Kramer, president. The company has acquired the Allen Basin, Eureka, Goat Gold and Silver and New Light properties near Barron, on which development work will continue. Plans are to increase the 100-ton mill to 200-ton capacity in the spring.

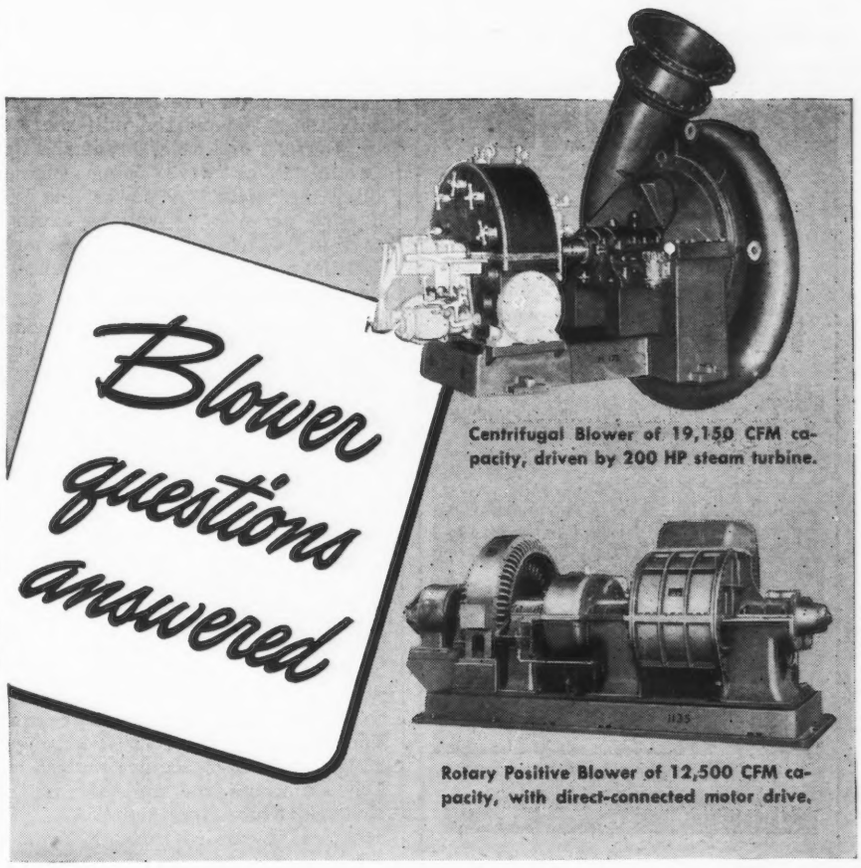
★According to George O'Bryon, Olympia, president of Fouress Mines, Inc., the company plans to start development work on the Pitney Butte mine in northern Lincoln County. The five claims have gold-copper and silver-lead-zinc vein systems and have been opened by almost 900 ft. of drifts and crosscuts and by 200 ft. of shafts.

★Spokane Molybdenum Mine, Inc., is developing a property consisting of five mining claims and 40 acres of deeded land in Lincoln County, according to Luke G. Bayley, president and manager. Open cuts had disclosed low values in gold and silver years ago but recent sampling showed high values in molybdenum. The company plans a 10-ton mill when low-level development has been completed to the main vein and a 500-ton plant.

A tunnel 200 ft. above the campsite has crosscut a vein 5 ft. wide, 70 ft. from the entrance. This vein has been drifted toward the east 276 ft. Three veins, one 12 ft. wide, have been intersected by a crosscut driven south at a 45° angle for 204 ft. Drifting on the 12 ft. vein has proceeded 40 ft., according to Mr. Bayley. Another crosscut has been driven 120 ft., 131 ft. from the portal of the lower tunnel. It is hoped that when the parent vein is reached at depth on the low tunnel level, it will be about 50 ft. wide. The molybdenum exposures average better than 4%.

★Pend Oreille Mines & Metals Co., experimenting with a new process of smelting zinc with electro-thermic vacuum furnaces at the Mead magnesium plant, is continuing its tests. Jens Jensen, secretary-treasurer, reported progress and improvement in test showings.

The 1,000-ton mill under construction at the Reeves-McDonald property across the Canadian border may be producing by the first of January, according to Mr. Jensen. Construction of the crusher building was completed early in October and a 30-in.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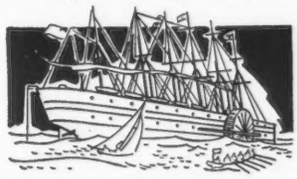

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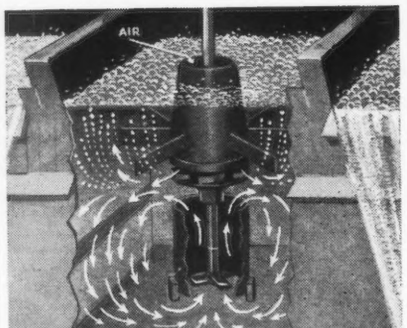

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Washington *(Continued)*

jaw crusher was being installed. Excavation for erection of a reservoir 100 ft. above the mill roof was in progress, and wells beside the Pend Oreille River were being sunk to filter the water. A power line from a mine near Salmo will be extended to the property. It is expected that 120-150 men will be needed when milling starts.

★Sunny Peak Mining Co., which is being organized by Glacier Silver-Lead Co., has purchased one property at Conconully and taken two other properties under lease and bond in the same area for development. Four of the Glacier directors have leased half a school section to provide surface rights between the Gubser and Mineral Hill. It is planned to extend the 880-ft. Gubser tunnel 200 ft. for exploration. This can be used eventually to get under the Mineral Hill and Mohawk mine northwest of Conconully.

★It was reported in mid-October by company officials of Kaiser's organization in Spokane that Permanente Metals expects to acquire the $23 million aluminum rod and bar mill at Newark, Ohio, from the WAA. The contract, if carried through, provides for a 10-yr. lease with an option to renew for 15 more years, according to D. A. Rhoades, general manager for Permanente.

★The contract for Columbia Gypsum Products Inc.'s $25,000 steel building for calcining, pulverizing and bagging operations has been awarded to Inland Empire Steel Building Co. of Spokane. The Ace Sand & Gravel Co., also of Spokane, was ready to pour the foundations early in October, according to Loren G. Brown, president, of Bremerton. Excavation for a large gypsum storage plant was under way. Plans are being made for the board and lath plant (570 x 120 ft.) and arrangements for a 700-ft. spur of the Spokane & International Railway to the plant. This will carry gypsum from the Canadian border to the Spokane Valley district.

★According to C. S. Thayer, works manager of Alcoa's plant at Vancouver, a million dollars is being spent at the plant to control the fumes which farmers have complained affect their crops and animals. An annual outlay of more than $100,000 will be needed for installation and upkeep, it has been reported. Washing equipment was installed after complaints in 1944 and they were partially effective in washing out the fluorides, Mr. Thayer said, but now hoods are being placed over aluminum pots to collect the fluorides and a system of fans, ducts, and washing towers is being added to purify the air before it is discharged.

ALASKA

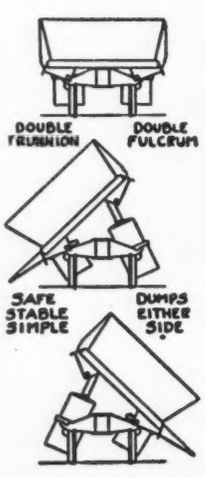
Bureau of Mines secures site for Juneau experiment station—Mineral investigations in Alaska listed

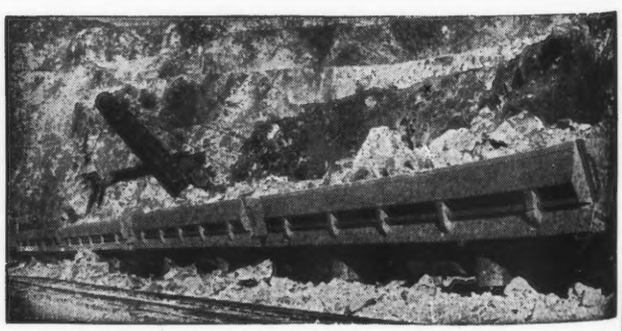
★Dr. James Boyd, director of the U. S. Bureau of Mines, has received a transfer from the Navy on property which will be the site of a $255,000 metallurgical experiment station on Juneau Island. The building will be the Alaska headquarters for the mineral investigation division, the economic division and metallurgical experimental division of the Bureau. The station will have facilities to sample all ore deposits. At present, ore samplings must be sent to Salt Lake City, Reno or Albany for testing.

★Gold Beach Mining Co., operating a new dredge east of Nome, closed down in October after a short but satisfactory season. The dredge was completed about the first of August.

★Pat Savage planned to go to Wild Lake the first of November to start drilling on property he has leased on Spice Creek, and six claims on Birch Creek. Mr. Savage is a mining man from the Flat district.

★Alaska Drilling Co. employed seven men this season in diamond drilling





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underground at its Silver King group, near Wrangell. W. A. Petersen reported in Juneau that results were encouraging and that work would begin as early as weather would permit in the spring. A 35 ft. quartz vein with a channel sample assaying $14 per ton was discovered on the ground.

★O. F. Benecke, of Alaska Coastal Airlines, reported at Juneau that 30 tons of fresh meat would be taken in by plane to two gold mines near Tulsequah, and other winter supplies have been carried in by air due to low water in the Taku River.

★Louis C. Stringer, a coal mine investor of New Jersey, used a Geiger counter in the Seward Peninsula area during the summer and was the first to tell of radioactive pitchblende there.

★Wolf Creek Mining Co. closed its operations in October, Manie Olson reported in Fairbanks.

★Mineral investigations underway in Alaska are: copper at Annette Is., Lake Clark and Iliamna Lake; coal in Matanuska; gypsum in Chichagof Island; lead-zinc on Taylor Creek, Duncan Canal and Groundhog; limestone at Mount McKinley; tin on Cape Wales; and other investigations in the Skagway Haines area and the Hyder district.

CANADA

Higher metal prices spur B.C. operations—Export-Import Bank considers loan for Macdonald Mines.

★The Munitions Board early in October arranged for stockpile purchases of copper from Canada, with contracts covering lead and zinc expected to be made at an early date. Canada, which uses only one-fourth of its zinc, about one-third of its lead, less than half of its copper, and about 5% of its nickel, is becoming self-sufficient in tungsten. The production of chrome ore is being studied with a view to exploring large deposits of low-grade ores. An important contribution to Canadian stockpiles of essential iron and titanium ores is expected to result from new mining developments on a large scale in Quebec. Under the 15-man Industrial Defense Board that was created April 20, 1948, an inquiry has been made into materials that are in short supply. An inventory of Canada's war potential found the country lacking in many minerals and metals, which are to be stockpiled. The object of this new policy is to insure that, in the event of war, Canada's industry will be able to make a maximum contribution with a minimum of delay.

★Canadian exports of non-ferrous minerals and their products in the first eight months of 1948 were valued

NEW METHODS DEMAND
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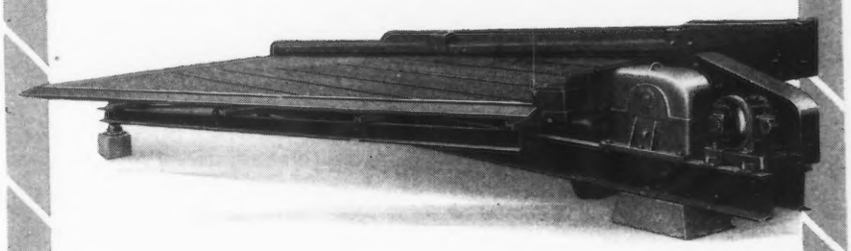

Heavy ore production during the past decade has emphasized the need for utmost efficiency in concentrating methods.

Owners of new processing plants, and of older plants that are being modernized, are installing SuperDuty Diagonal Deck Concentrating Tables as standard equipment.

Engineers and operators alike recognize the high efficiency of these space-saving tables. They know that the diagonal deck and the smoothly coordinated action make for higher grade concentrates, leaner tailings and fewer middlings for recirculation.

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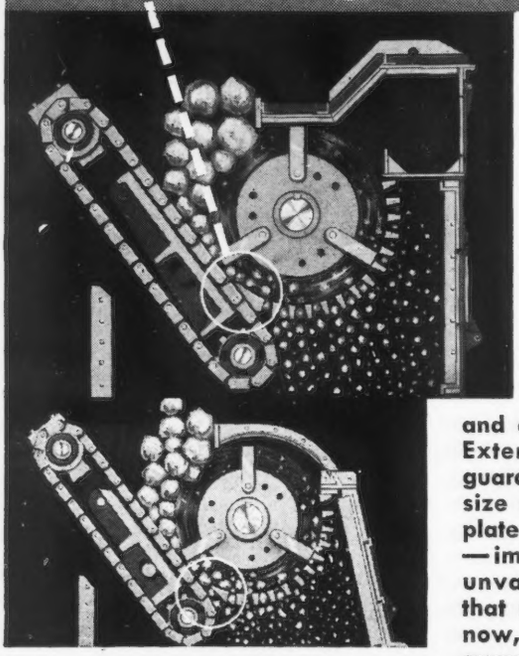

Crushing money is saved or squandered in the "heart" of the mill...where reduction begins! That's why the headline feature of the new improved "36 Series" Dixie Hammermill is the extension of Dixie's Continuously Moving Breaker Plate*... a unique, money-saving innovation that sets a new standard of crushing efficiency.

Note by comparing before and after diagrams how the new, Extended Moving Breaker Plate guards against the passage of oversize material between the breaker plate and front cage bar. The result —improved grinding control for unvarying uniformity of product that makes the Dixie Hammermill now, more than ever before, your guarantee of greater production at less cost.

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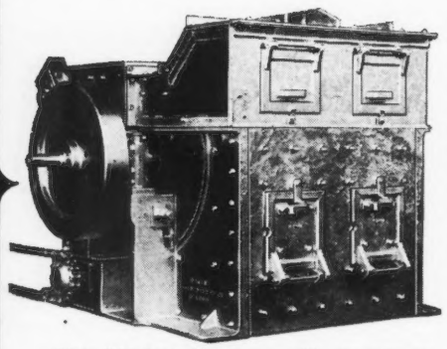
Other important changes in the new "36 Series" Dixie Hammermill include:

- 1. All-steel construction for greater strength . . . longer life
- 2. Flange type end discs of all cast steel for protection of hammer bolts and nuts from wear at ends
- 3. Convenient clean-out and inspection door
- 4. Metal trap (optional) for facilitating removal of tramp iron.



Dixie "36 Series" Hammermills, for primary or secondary crushing, are built in 4 sizes in capacities ranging from 25 to 150 tons.

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Canada (*Continued*)

at $197,471,000 against imports amounting to $107,624,000. Nonmetallic minerals and their products in the same period were listed at only $46,898,000 for exports compared with imports valued at $278,567,000.

Major gains were shown in September by Canadian industry, particularly the heavy iron and steel groups. These were up to the record levels that were set a year ago, according to the index of the Canadian Bank of Commerce. Smaller advances were made by nonferrous metals and medium and light iron and steel groups, while nonmetallic minerals declined slightly. In several branches of the mining industry more skilled workers were required to replace students who returned to the universities. The employment picture was generally satisfactory in most of the mining camps.

Both Quebec and Ontario faced power shortages that were expected to persist throughout the winter months, leading to cuts in the milling rate at many gold mines. A year ago the water shortage led to a 10% reduction in power, followed in February and March by an additional cut of 5%. Auxiliary diesel units at a number of mines went into use in November.

QUEBEC

★Increased demand for power in mining districts of Northwestern Quebec has led to installing new capacity at two major hydroelectric sources. Northern Quebec Power Co. is expanding its Quinze plant from 40,000 hp. to a potential 119,000 hp. By next May the capacity will be up to 50,000 hp. to supply the new 2,000-ton concentrator of Quemont Mining Corp. Noranda Mines is the largest customer of the government-owned Quebec Hydro, which is installing a fourth unit good for 18,000 hp. at the Rapid Seven plant on the upper Ottawa River.

No curtailment of power is expected this winter from the Quebec Hydro's generating plant, but Northern Quebec Power started on Nov. 1 to cut loads 10% for mines as well as municipalities. The Normetal mine in August was cut off completely from current supplied by the La Sarre Power Co., the mine and mill making use of its diesel equipment for full requirements.

★The Quebec Department of Mines has reported an increase of 21.6% in gold output for the first eight months compared with the same period last year. Part of this increase is accounted for by Noranda's shutdown early in 1947 during the strike. Gold shipments for the eight months in Quebec were 491,065 oz. Silver output amounted to 1,521,952 oz. and asbestos, 454,657 tons. Cement, clay products and lime were all substantially above last year.

★A. H. Robertson, manager of Kennco

Explorations, reports that railroad construction was started in September north from Havre St. Pierre 29 miles to the Allard Lake titaniferous magnetite deposits. No details have been made public concerning this major project, which involves very substantial investment in developing the world's largest known deposit of ilmenite. The grade indicated by several years of diamond drill exploration averages about 30% titanium and 40% iron.

The Shawinigan Water and Power Company is to provide hydro for large metallurgical facilities at Sorel, on the St. Lawrence River 50 miles below Montreal.

★Labrador Mining and Exploration Co. and Hollinger North Shore Exploration Co., controlled by Hollinger Consolidated Gold Mines and the M. A. Hanna Co., reported in October that diamond drilling and churn drilling had been successful in indicating 300 million tons of iron ore. This volume, set as the minimum figure to be shown before railroad construction could be started, is restricted to the western zone over a length of about 70 miles. The east zone has been found by only limited work to consist of small, good grade orebodies.

Ore reserves now indicated represent only those bodies that outcrop, with efforts planned for the next five years to locate additional deposits that may be obscured by overburden. The concession agreement requires that ground to be retained in Laborador must be reduced to 1,000 square miles by 1953. John Knox is consulting engineer and W. H. Durrell is general manager of this project.

★On the property of Lake Dufault Mines, adjoining east of Waite Amulet Mines in Dufresnoy township, promising new ore chances have been indicated as a result of deepening the exploratory drill hole No. 62. This vertical boring located the main contact at about 1,450 ft. The contact between two lava flows represents alteration similar to that associated with copper orebodies in this area.

In order to make possible an investigation of the favorable structure, drifting has been resumed north along the joint boundary between the two properties. This drift, on the 1,050-ft. level of the Amulet Dufault workings, will be used for detailed drill exploration. Amulet Dufault Mines owns the Lower A orebody, which is located about 2,000 ft. south of hole No. 62. Ventures Limited controls the Lake Dufault Mines and Noranda controls the Waite Amulet company.

★The Toronto Stock Exchange issued a report in October which confirms recent rumors that the Export-Import Bank is considering a loan to MacDonald Mines of $2,500,000. The property, located east of Dufault Lake, has been explored by a three-compartment shaft to 950 ft. The upper orebody has been indicated by explora-

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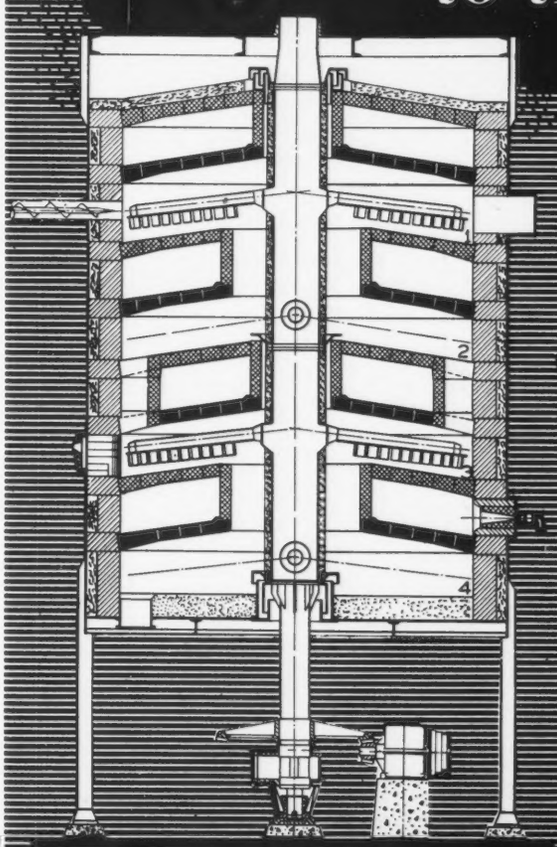

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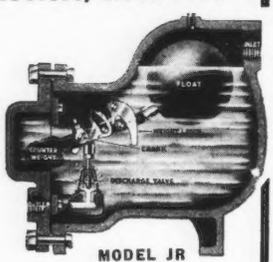

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Canada *(Continued)*

tory work on the 325-ft. level to comprise some 7 million tons averaging 85% pyrite with 3.69% zinc plus $1 per ton in gold and 62c. in silver per ton. It has been reported by Stewart Troop, vice president, that $3 million is required to put the property into production with a 1,000-ton concentrator.

★A recent report to stockholders of Candego Mines, Ltd., advised that in the ore zone now under development, the high-grade vein has been opened up for a length of approximately 600 ft. with widths up to 15 inches. The ore in this shear zone consists of veins of massive galena averaging between 75% and 80% lead and approximately 75 oz. of silver per ton. Engineers of the company estimate that 15,000 tons of the high-grade ore are indicated in the opened up portion of the vein for a length of 600 ft. and over a vertical exposed difference in elevation of 250 ft.

ONTARIO

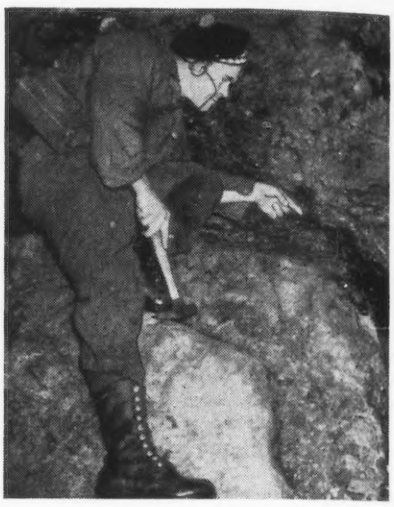
★The Canadian Congress of Labor, which recently suspended the International Mine, Mill and Smelter Workers Union, has given its support to revolts by two locals of the union in Ontario. The break in both cases was in protest against Red domination of the international organization. The local at Timmins denounced the union as a tool of Communist organizers from the United States. At Port Colborne the local also withdrew after a majority vote against Communist leadership.

★Gold mines in the Larder Lake, Kirkland Lake, Matachewan and Porcupine camps have made a voluntary 10% cut in consumption of electric power. The critical reduction in water storage last summer threatens to force a reduction of from 12 to 15% in mine requirements through the winter.

★Cobalt metal, regularly produced at the Norwegian refinery of Falconbridge Nickel Mines at the annual rate of 150 tons, is now being recovered at the Port Colborne refinery of International Nickel, amounting to about 250 tons a year. It has been reported that wartime accumulations in Canada of imported South African cobalt ores have been sold recently in the United States.

★Young-Davidson Mines, located in the Matachewan district and under Hollinger management, in October used 56 tons of explosives for a blast between the second and third levels. More than 200,000 tons of ore were broken, after preparations involving 124,000 ft. of drill holes had been in progress for a year. The mill rate for the first 10 months has averaged 879 tons daily; this has been reduced to 700 tons as a result of the hydro shortage. Capacity of the mill is 1,050 tons, the ore grade being about $3.30 per ton. A. R. McKay is president.

★A reported 225 claims have been staked in the 22-mile area between Pancake Bay and Montreal River, following a find of uranium ore in October. The Ontario Department of Mines



Robert Campbell, carrying Gerger counter, points out pitchblende discovery in Ontario.

and Federal Mines Department are checking reports which indicate that pitchblende from this district is rich in uranium. Robert Campbell, Toronto mining man, made the actual discovery when he spotted the ore in coastline rock where erosion had bared a two-inch seam of pitchblende.

BRITISH COLUMBIA

★New Canadian price for lead, announced by Consolidated Mining & Smelting Co. of Canada, is 20¾c. per lb., delivered at Montreal and Toronto. Previous price was 18¾c., in effect since July 30.

★The pattern of increasing development in B.C. mining accompanying a brighter price picture is reflected in the operations of several major companies. Reeves-MacDonald, Salmo, has announced plans to put the first 500-ton unit of its 1,000-ton mill in operation at the end of the present year, with mill and camp construction ahead of schedule.

★Some 600 miners at Britannia Mining and Smelting Co., Britannia Beach, have accepted an offer bringing pay rates to $10 daily, including four 25c. bonuses based on the price of copper. Basic rate was raised from $8.35 a shift to $9.

At Copper Mountain another 600 miners have voted for strike action against Granby Consolidated Mining, Smelting & Power Co., turning down a 25c. per shift offer which would bring the pay rate from $9.35 to $9.60 per shift, including bonuses.

★According to B. C. Mines Minister, R. C. MacDonald, definite radio activity has been found in Fraser River placer sands near Lytton; in samples of ore from Hazelton View mine, near

Hazelton, and in samples of ore from an "unknown source."

Meanwhile, Pacific Uranium Syndicate reports good results on a Geiger counter in a narrow vein west of the Jewel mine workings, one of the sites of the original Gold Bridge, Bridge River uranium finds. In addition to staking 23 and optioning four claims in the area, the syndicate is proceeding with investigation of other properties in B. C.

★Shipments of custom ores to the Trail smelter of Consolidated Mining and Smelting Co. totaled 8,970 tons for the four-week period ending Oct. 23. A total of 3,216 tons went to the lead plant; 5,754 to the zinc plant.

Leading shippers, in addition to B. C. mines, included New Calumet, Quebec, with 682 tons to the lead smelter; and Derby & Co., Australia, 159 tons of lead ore. Zinc shippers included Goldfields Consolidated, Washington State, 450 tons; American Metal Co., Callao, Peru, 1,630 tons; Grace & Co., Callao, Peru, 975 tons; and Derby & Co., 386 tons.

★Silversmith Mines, Ltd., has agreed to sell its Silversmith, Slocan Star and Silver King properties in the Sandon area of Slocan district, to R. Crowe-Swords of Vancouver on a three-months option basis, payments to cover a period of five years.

Silversmith is acquired with all "apex" rights dating back to the days when the Apex law was in force, giving the owner the right to follow ore on the dip of the orebodies into adjoining ground. Values are chiefly in zinc, with a good content of lead and silver. Revamping of the flotation plant to increase efficiency is planned.

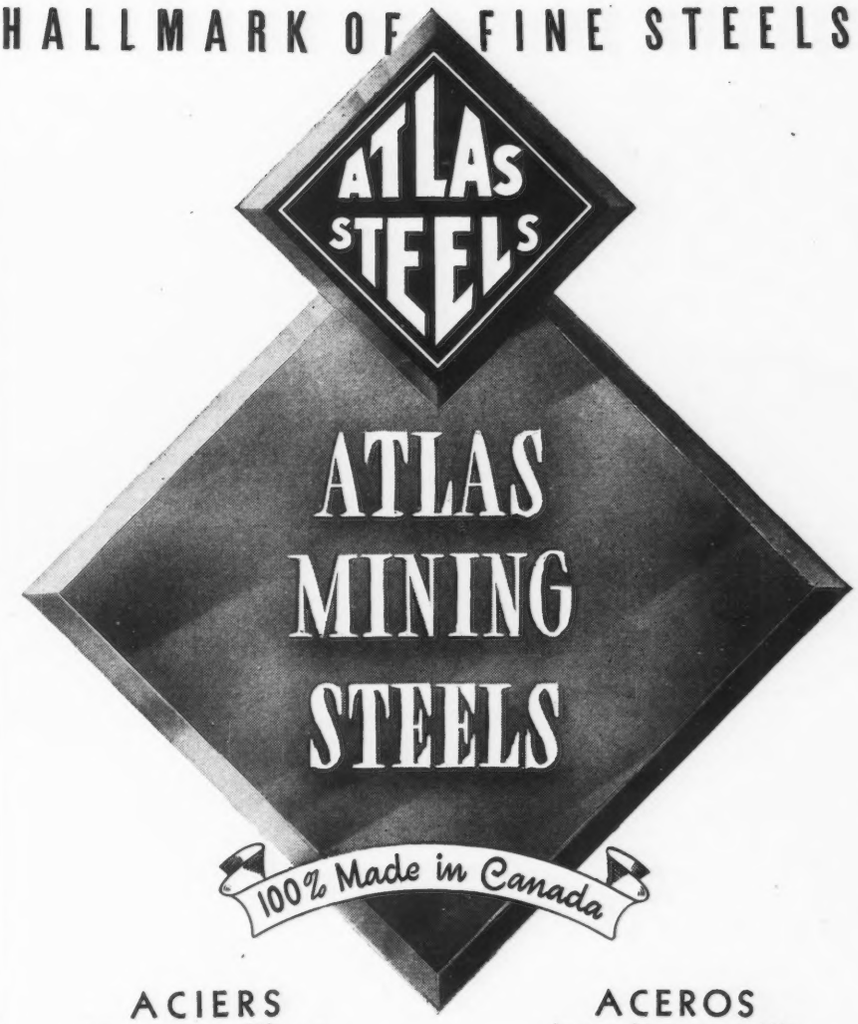
★Copper Island Mines, Ltd., is inaugurating a diamond drilling program in the silver-lead-zinc region of Copper Island, Babine Lake. A 40-ft. wide shear zone had disclosed surface values in the three metals, with 22 in. of solid galena reported in one of the old tunnels.

★Hedley Monarch Gold Mines, Ltd. completed shipment of four cars, totaling 183 tons, to Tacoma smelter up to the first of November under its contract agreement with Donald Cameron and Associates. Shipments returned 103 oz. gold, an average of 0.59 oz. per ton., Neil McDiarmid, secretary-treasurer, disclosed.

Company officials are studying possibilities of an agreement with Hedley Mascot Gold Mines, Ltd. for milling of Monarch ore at the Mascot plant 25 miles away. Alternately, the company would use a 25-ton plant near the Monarch owned by Joseph Wukelick, of Princeton.

★Privateer Mine, Ltd. closed down its operations at Zeballos on Vancouver Island with completion of milling of broken ore at the end of October. N. E McConnell, managing director, announced a small crew would remain on the property for several months to

HALLMARK OF FINE STEELS



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Canada *(Continued)*

put equipment into shape for an indefinite shutdown period. No development work will be carried on. Production for September was 1,146 oz. of gold and 679 oz. of silver, valued at $40,612.

★Granby Consolidated Mining, Smelting and Power Co., with operations at Copper Mountain and Allenby in Similkameen district, increased its output slightly in the third quarter, with a consequent higher net profit. Tonnage milled was 412,580, compared to 410,884 in the second quarter; copper output climbed to 6,471,649 pounds from 6,196,696.

★Moderate drop in production is reported by Bralorne Mines, Ltd., Bridge River, for the third quarter of 1948, with 17,183 oz. gold recovered from 33,639 tons milled for a return of $601,405, compared with a second quarter recovery of 19,420 oz. from 38,488 tons valued at $679,700.

No further work will be done at the Yalakom property this year because the season was too far advanced before the road, washed out by spring floods, could be repaired and rebuilt.

MANITOBA

★Hudson Bay Mining and Smelting Co., Ltd. reports that in the first nine months of 1948, a total of 1,396,295 tons of ore was treated. Profits after all charges amounted to $11,610,457. For the corresponding period of 1947, 1,383,610 tons treated gave earnings totaling $9,635,753.

The company has commenced work on the construction of a slag fuming plant, estimated capacity to be 300 tons of residue per day, to recover more zinc. Completion is expected by 1950.

★Cuprus Mines, Ltd., subsidiary of Hudson Bay Mining and Smelting, is expected to go into production soon, at a milling rate of 300 tons daily. Concentrates will be trucked to Flin Flon for treatment. The Schist Lake mine is expected to reach the production stage next year.

★Hourly rated employees of Sherritt Gordon Mines, Ltd. at Sherridon voted to have the A. F. of L. certified as their bargaining agent with the company. This is the first time the A. F. of L. has been selected by the majority vote. The C.I.O. has represented the employees since a bargaining agent was first certified several years ago.

★A new gold find is reported 35 miles east of Sherridon, midway between Sherridon and Snow Lake. The find was staked for International Mining Corporation (Canada), Ltd., and other companies are reported to be staking in the area.

★Denison Nickel Mines, Ltd. reports that no further work is contemplated on its group of 39 claims in the Lynn Lake area, where a program of diamond drilling was carried out last year.

★MacDic Copper Mining and Smelting Co. has completed three shallow drill holes completed on its Sherridon group of claims giving low copper and zinc values on the No. 1 zone.

★Winora Gold Mines, Ltd. reports that prospecting and geological mapping carried out on its Lynn Lake property did not reveal any gold values. Sufficient work was completed to keep the claims in good standing until 1949.

★Asarco Exploration Company of Canada, Ltd. is conducting development work on the Toburn group of claims which are located northwest of Lynn Lake. Diamond drilling of anomalies has indicated a zone carrying copper values.

★Sangold Mines, Ltd. in the Rice Lake area, plans further drilling on its group of 16 claims adjoining Sannorm Mines, Ltd.

★At San Antonio Gold Mines, Ltd. conditions have been improving steadily during the year, and to September 1st 102,924 tons were milled. Average millhead per ton was 0.3085 oz. or $10.79. Operating costs were $7.24 per ton.

★The Jeep Gold Mine, Ltd. is shipping 30 tons a day to the San Antonio mill. Latest figures reveal that 5,285 oz. of gold have been milled from 5,279 tons of ore, giving an average recovery of 1.001 oz. per ton.

★The gold output from Manitoba and Saskatchewan mines for the first six months of 1948 was 92,611 oz. compared with 88,597 oz. for the same period of 1947.

SASKATCHEWAN

★Resources Minister J. H. Brocklebank has announced that a total of 731 claims have been recorded in the Pre-Cambrian areas of Saskatchewan so far this year This is believed to be a new record for the province.

★Veins carrying pitchblende have been discovered in the Black Lake area 400 miles north of Lac la Ronge. W. J. Bichan, Director of Mineral Resources, reported recently that engineers from Eldorado Mining and Refining Co. have visited the area, which has been placed under Crown Reservation.

YUKON

★The year was favorable for silver-lead mining in the Mayo and Keno Hills area, reports indicating unusually high assays of silver and galena. United Keno Hills Mining Co. employs 200 men the year around. Workers on Mackay Hill expect to ship 500 tons of ore during the winter. Their supplies have been dropped from airplanes. Silver Basin Mines reported a satis-

factory season at properties including the Rasmusses. Keno Hill Mines were operating the Elsa mine and mill and the Calumet mine in October. A bulldozer was being used on Keno Hill.

★A mining syndicate from Toronto has dropped supplies and food by parachute to its Beaver Hill mine, 40 miles north of Keno Hill. It is reported that 500 tons of crude ore will be taken by tractor from the property this winter to Keno Hill and then to Mayo.

★Brown-McDade gold holdings on Nansen Creek, inactive this season, are reported to be considering a work program for 1949.

★The largest nugget of the year reported in the Yukon—19 oz. 8 dwt.—was taken from ground of Louis Engles on Livingston Creek.

★Other operations reported are Kluane Dredging Co. and Henry Besner, operating on Burwash Creek, Macdougall on Bullion Creek, Erwin Ray prospecting on Shorty Creek. McAuley and Vass are to resume work on Shorty Creek in 1949.

MEXICO

American-Mexican interests to invest $5 million in Guerrero—Small mines to suspend operations temporarily

★The Mining Chamber of Mexico was partially successful in its plea for relief of what it called the tax burden on the industry, as there has been an appreciable reduction in the levy on production. However, the extra 15% ad valorem export tax continues.

Mining workers of Chihuahua, Durango, Coahuila, Zacatecas, Guerrero, San Luis Potosi, Oaxaca and Guanajuato have asked the President to order mining exempt from the 15% tax, declaring that it is becoming impossible for their employers to continue "under that burden." But the miner's union is pressing the move it began just after monetary devaluation, July 22, and just before enactment of the 15% extra export tax, for yet another increase in wages.

★Interest demonstrated by the large number of mining claims filed in Oaxaca has encouraged resumption of exploring by eight groups of engineers and geologists, directed by Ing. Jenaro Gonzalez Reina, geological section, National Economic Research Institute. Rains halted the explorations and the National Commission for Stimulation of the Mining Industry that is directing them says the search will be intensified during this dry period.

★The federal court at Torreon, Coahuila, sentenced 13 prospectors, convicted of stealing ore in Mineral Ojuela, Mapimi municipality, Durango, to eight months in jail each, a fine of 100 pesos ($14.47) each, in default of which another month in jail must be

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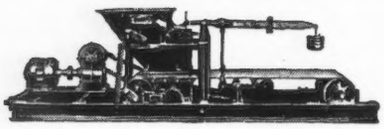

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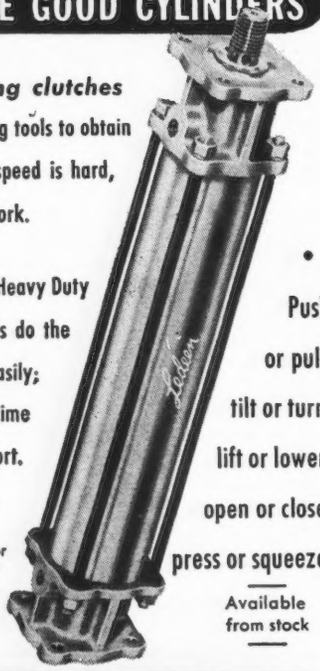

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Mexico (*Continued*)

served, and their two "fences" (buyers of the stolen ore) to six months imprisonment each and a fine each of 250 pesos ($36.17). The court rejected the prospector's plea that the ore was taken from abandoned mines and taking and selling it was their only means of livelihood because of the mining depression in the region.

★Fomento Minero de Santa Ines Yatzeche, S. A., Oaxaca City, has reached an agreement with workers allowing a 10% raise in wages.

★The Federal Supreme Court has rejected the appeal of San Francisco Mines of Mexico, Ltd., from the Federal Board of Conciliation and Arbitration's ruling that it must indemnify the widow of a machinist's helper who was killed on duty. The company contended that the man was killed because of his own negligence but the high court upheld the Board's decision that the death was in line of duty.

★Indications of high-grade silver and lead ore have prompted plans for a mill by the Minas de Guatama, S.A., Butac, Sonora, operated by a Spokane, Wash., syndicate. H. Grattan Lynch heads the Washington group and is also in charge at the properties.

★Ing. Manuel Franc Urias, president of the Cia. Minera Concepcion, Mexico City, has announced a $5-million investment for various mining operations in Guerrero by American-Mexican interests. He named Hugh Drum, John Rascomb, Raymond Sullivan and Charles L. Bradbury, manager of the Cia. Minera Mezcala, S. A., as the Americans in the enterprise. Both Mexican mining companies have been consolidated, Franco Urias explained. The operations will feature intensive exploitation of the Mezcala's silver properties with machinery and equipment recently acquired in the U. S. Maximum production, at an estimated 30% increase, is expected in from one to three years.

★A recent underground fire in San Pedro mine, near San Luis Potosi, is holding up operations temporarily. The mine has been shut off to allow the fire to burn itself out.

PERU

★It is reported from Peru that several foreign concerns have shown much interest in the Huanta region, in the Department of Huancavelica, and at least two are prospecting some of the claims. Ores are said to be very rich in the surface zone; a good estimate of the average grade would be about 15% lead, 12 oz. of silver and 0.15 oz. of gold. The construction of a 40-mile road is being planned to make the region accessible to the Huancayo-Huancavelica railroad.

★A government decree of September 6 has completely changed the systems of exchange control and import licenses in Peru. Formerly only the gold producers received the so-called "gold certificates," which meant that they could sell their dollars in the free market. Producers of other export commodities had to turn in their dollars to the Government and received Peruvian currency at the official rate of exchange of 6.50 soles per dollar. Now all exporters will receive 35% of the value of their exports in "import certificates," which are equivalent to the "gold certificates," and may be sold in the free market at about 14.00 soles per dollar.

★Mines of the Algamarca region, in the Province of Cajabamba, about 200 miles inland from Trujillo, are being developed, with the technical and financial aid of the Banco Minero del Peru. Most important mines are at Araqueda and belong to the Orbegoso family. Some work was done here several years ago. The present project calls for thorough prospecting, with a view toward the installation of a plant. Average grade of ore at Araqueda is 8% copper and 20 oz. of silver.

[Ed. Note—José Luis Bustamante y Rivero was deposed as President of Peru on Oct. 29 by the Army and replaced by General Manuel Odria.]

CHILE

Caja de Credito Minero to increase capacity of cyanide mills—President orders completion of refinery

★The President vetoed the so-called "gold law" which would have allowed gold miners to export their gold to foreign markets at about $47 an oz., and import freely with the resulting dollars. The principal observations contained in the message sent to Congress by the President vetoing the law are as follows: The miners will not be allowed to import classes of merchandise other than those contained in a special list compiled for the purpose by the Government and representatives of the Mining Society. Luxuries will be excluded from the list. In order to be able to export gold to obtain dollars the miners will have to obtain certificates from the Mining Bank proving that the gold exported has been obtained from Chilean mines, and the miners will only be able to import goods with the gold exported at the rate of $35 per oz. The dollars obtained above this price cannot be used to import goods.

★Caja de Crédito Minero has again increased its buying schedule for gold ores fit for cyanidation, because of the greater price of metallic gold in the Chilean market. This increase in

the price of gold in the local market simply reflects the devaluation of the Chilean peso.

★Because of large increases in the stocks of ores at the Caja's mills, Caja is spending about half a million dollars in increasing the milling capacity of its cyanide plants at El Salado, Elisa de Bordos and Domeyko. It will also build a new cyanide mill at Puente Negro, near the town of Illapel, Coquimbo Province, to treat the gold ores from the southern end of this province and save freight to the Domeyko mill.

★Two new gold mines are being developed by well known Chilean miners, Messrs. Alfaro and Alday. One of the mines is located in Atacama near the Los Morros copper camp and the other is in Coquimba near the Huilmo gold placers. Both are narrow but high-grade quartz veins.

★According to the Chilean Corporation for the Sale of Nitrate and Iodine, American farmers will be able to buy 660,000 tons of Chilean nitrate during the present year.

★At Andacollo, oldest and best known of the Chilean gold camps, 65 Chilean mills are working night and day, milling and amalgamating about 300 tons of low-grade gold ore per day. The miners from this camp are asking the Chilean Mining Bank to install another 1,000-hp. diesel engine so that they might be able to put up more mills.

★The President of the Republic has ordered Caja de Crédito Minero to take charge and finish the project to build an electrolytic refinery at Guayacán, near the port of Coquimbo, to refine the blister bars from the Chagres and Paipote smelters. Capacity of the refinery will be 20,000 metric tons of copper a year, and the power needed, about 2,000 kilowatts will be obtained from the hydroelectric power plant under construction at Los Molles. Mr. Fernando Benitez, manager of the Paipote Smelter Co., has been placed in charge of this new project.

★Representatives of the Foley Brothers construction company, Pleasantville, N. Y., left for Chuquicamata in October to make preparations for building the $60 million copper smelter of Anaconda's Chile Exploration Co.

PHILIPPINES

New equipment to open lower levels at Mindanao—Union not to be sole bargaining agent, Court rules

★Operations at the mines and mill of the Benguet-Balatoc plant were suspended for six days on Sept. 14 when 3,000 mine employees went on strike. This was the first instance

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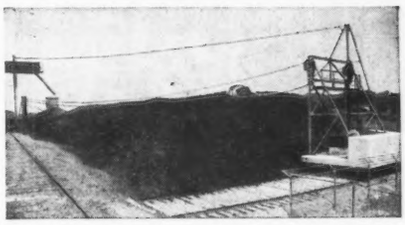

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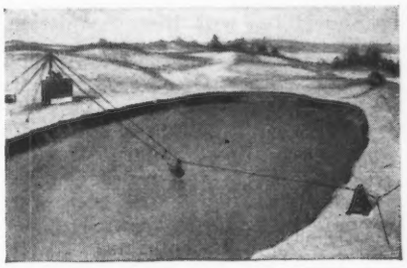

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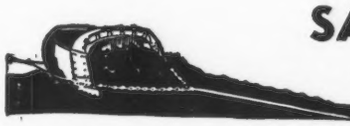

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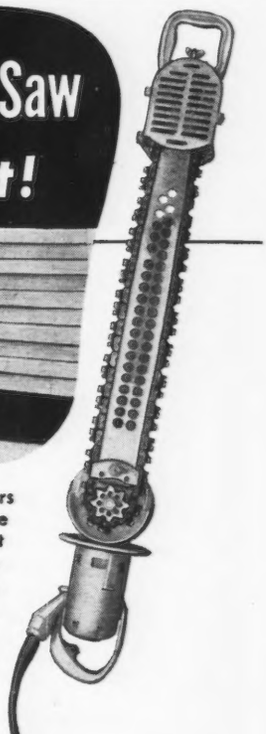

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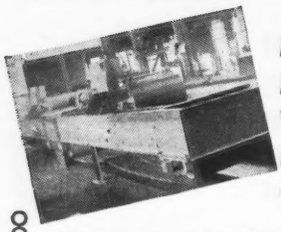

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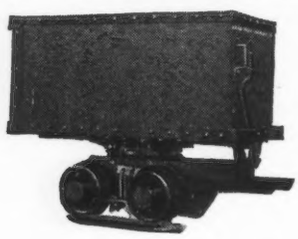

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Philippines *(Continued)*

in the long history of the Benguet company of any serious labor trouble. The Court of Industrial Relations immediately was called to make an investigation and ordered resumption of work on Sept. 20, pending the court decision. As a consequence of the shutdown, production for the month declined to $166,300 from milling 22,000 tons.

★Normal mining operations continued during September at the Atok-Big Wedge mine, with production of $187,000 from 13,165 tons. Sinking was begun to the 800 level and on the 500 level crosscuts were driven to the Keystone vein, but a heavy water flow interfered with their completion.

★The chromite mines are making progress. In October Misamis Chromite Co., operating in the province of Oriental Misamis, Mindanao, had made its first shipment of 1,077 tons to Tacoma. The ore is reported to average 49.6 Cr_2O_3 with a chrome-iron ratio of 2.65. The next shipment was expected in November. Acoje Mining Co., Zambales, was scheduled to ship 5,000 tons in late October, when the loading pier was to be completed. Production continued at the mine where about 12,000 tons had been stockpiled. At Masinloc shipments were interrupted by delays in arrival of freighters and declined to 11,400 tons for September.

★August production at Surigao Consolidated was $73,135 from 7,197 tons, averaging about $10 per ton. Present milling rate is 275 tons per day. Late in September the mill circuit was changed over to straight flotation, to permit larger mill capacity and reduce marketing costs by recovering a larger percentage of gold as bullion.

★At a stockholders' meeting of Lepanto Consolidated, it was declared that for the period Sept. 1-28 the mill had treated 6,280 tons with an average copper content of 4.86% copper and $4 gold per ton. Copper recovery was 91.7%, and gold 78.4%. Concentrates recovered were 850.8 tons carrying 32.8% copper and 0.675 oz. gold per ton.

The company estimated the net value of the September production at Tacoma at $144,000. Under a new contract the company will collect 80% of the value of the shipment within 15 days after arrival. Gold will be returned to the Philippines for sale in the open market, where higher than the statutory price has been obtained. The foreign price will be received for copper.

★According to the American Chamber of Commerce in Manila, the Court of Industrial Relations has ruled that in no case will a duly registered union be made the sole bargaining agent and the management may deal with non-members individually. The Court has consistently denied the closed shop and check-off, as well as prior reference to the union for dismissals, suspensions or penalties.

The demand for 50% additional for work on Sundays and holidays has been generally granted, and vacation and sick leave with pay after a year's service have been approved. The Court has denied the demand for pay during the period of a strike. In two cases the Court fixed salaries and wages for night work at 50% over regular day work pay, but several applications for revision of this figure are pending. Demand for back pay or bonus for time lost during the Japanese occupation have been consistently denied by the court, it is reported.

★Greatly increased mill heads are expected before the end of 1948 at Mindanao Mother Lode with the arrival of equipment to dewater the lower levels of the mine, flooded since the war shut down operations in early 1942. In early October mill heads were running $15 to $16.50 ($35 an ounce value) per ton, and tonnage averages under 200 tons daily. Mill heads of $30 are expected from a daily tonnage of 290 tons by January.

At present ore must be taken only from the upper levels, where values are fairly low. A company official states one pump will be installed on the 700 level and two on the 850 level. Mindanao's 1941 production, which made it the most valuable mine in the Philippines, was based on ore from the Tabon-Tabon vein, which will be uncovered by the new pumps. In addition ore is expected to come from a crosscut from the 540 level into the Jesus vein.

★The mining industry in the Philippines has been encouraged by news of the first partial payment of a war damage claim submitted by a mining company. Lepanto Consolidated Mining Co. received $721,270.16 pesos from the U. S. Philippines War Damage Commission in September.

AFRICA

New Pioneer Central Rand acquires prospecting rights—Lower profits by Johannesburg Consolidated

★The South African Government has decided to reduce the statutory ratio of gold reserves in the Reserve Bank to liabilities to the public from 30 to 25%. The necessary legislation has been passed by Parliament.

There is still uneasiness in South African circles at the continued high dollar expenditure on non-capital goods, with the resultant outward flow of gold to the United States, but the government does not want to reimpose import control if it can be avoided. It takes the view that the American goods now being imported

(Continued on Page 150)

BULLETINS

(*Continued from Page* 119)

Gas Analyzer. Burrell Technical Supply Co., 1942 5th Ave., Pittsburgh 19, Pa., has issued Bulletin 213 describing a gas analyzer useful for combustion control and furnace atmosphere analysis.

Powder Metallurgy. New Jersey Zinc Co., 160 Front St., New York 7, N. Y., has released an informative booklet explaining the preparation, applications and properties of non-ferrous powder parts, also the composition and characteristics of numerous brass powders.

Ten Ways to Cut Costs. The Wood Preserving Division, Koppers Co., Inc., Pittsburgh 19, Pa., has released a booklet showing 10 ways to cut mine costs by preserving various wooden supplies.

Built-On Pumps. Bulletin 48-2040, published by Byron Jackson Co., Los Angeles 54, Calif., describes and illustrates the "Bilt-On" pump, a single suction, single-stage pump coupled to an induction motor available in 322 combinations for capacities from 10 to 600 gpm. at heads up to 340 ft.

Pneumatic Controls. Catalog ND4B, published by Leeds & Northrup Co., 4911 Stenton Ave., Philadelphia 44, Pa., describes pneumatic control equipment for regulating plant processes in chemical and other industries.

Dust Control. W. W. Sly Mfg. Co., 4700 Train Ave., Cleveland, Ohio, has issued Bulletin 98 describing their line of cloth type dust collectors for industrial plants.

Steel Reinforced Mittens. American Optical Co., Southbridge, Mass., has released a folder describing several types of steel reinforced gloves, mittens and hand pads for rough work.

New Drifter. Bulletin 87-D, released by Joy Mfg. Co., Pittsburgh 22, Pa., describes and illustrates the new Silver Streak drifter available in 2¾ to 4" cylinder bore classes.

Power Factor. "Power Factor and What to Do About It," is the title of an informative pocket-sized booklet No. 200-TEC-1077 issued by Electric Machinery Mfg. Co., Minneapolis 13, Minn. It explains the causes of low power factor, and recommends remedies.

Metallizing Guns. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., has issued Catalog 401 illustrating metallizing guns for every purpose.

Diesels Dissected. International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill., has issued a profusely illustrated booklet showing cut-away and sectional views of international diesel engines and power units.

Nickel Alloy Steel Castings. Typical applications of nickel alloy steel castings in mining, milling and smelting plants are illustrated in a booklet recently issued by International Nickel Co., 67 Wall St., New York 5, N. Y.

Silver Alloy Brazing. Low temperature silver-alloy brazing with "Easy-Flor" or "Sil-Fos," extensively used for joining pipes and tubing, is described and illustrated in Bulletin 17 released by Handy & Harman, 82 Fulton St., New York 7, N. Y.

Steel Forms for Tunnels. Robert S. Mayo, construction engineer, Lancaster, Pa., has issued a folder illustrating circular, rectangular, elliptical and other types of steel forms for tunnel driving.

Portable Geiger Meter. Precision Radiation Instruments, Inc., 1101 N. Paulina, Chicago 22, Ill., has issued a folder describing Model 101 portable survey meter suitable for laboratory and prospecting purposes.

Lightweight Plaster. Combined Metals Reduction Co., Salt Lake City 1, Utah, has issued a folder describing "Panacalite," a plaster aggregate which is approximately one-fifteenth as heavy as sand and has important soundproofing and insulating qualities.

Cyanide Machinery. The complete line of machinery for cyanidation for gold and silver ores of the Morse Bros. Machinery Co., Denver, Colo., is listed in their Bulletin C-48.

Load-Center Layout. A planning and engineering guidebook to simplify layout of Allis-Chalmers load center unit substations has been released by the company. Write to Allis-Chalmers, Milwaukee, Wis., for 11B6895.

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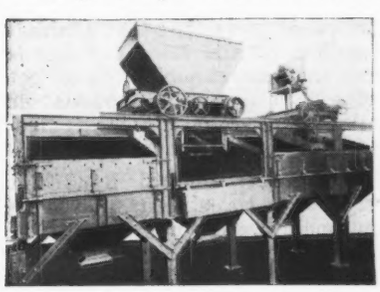

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Africa (*Continued*)

are needed for the Union's development.

The gold ratio has been dropped steadily in the last two years, as the result of gold leaving the country in large amounts. Last month it was down to a new low of 31.3%. In the first six months of this year, gold holdings have dropped from £187,100,000 to £75,600,000.

On the other hand, the Reserve Bank's sterling balances increased from £50,400,000 at the end of 1947 to £82,300,000 at the end of May, mainly because of the influx of British capital. It dropped to £71,900,000 at the end of June and to £55,300,000 at the end of August, indicating a dropping off of British capital from June to August.

★In 1937, only 1,501 new companies with a capital of £5,000,000 were registered in the Union. This year's figures indicate that registrations will exceed 4,500—there were 2,342 registrations in the first half of the year, their capital being £83,494,000. Last year 3,741 companies registered with total capital of £98,000,000.

In 1939 imports were valued at £91,000,000 and in 1947 at £295,000,000. Exports, including gold, were £125,000,000 in 1939 and £241,000,000 last year. Gold accounted for £141,000,000. In the first eight months of this year the Union sold gold valued at £80,837,000 to the United States, £17,929,000 to the United Kingdom, £1,001,000 to the Belgian Congo and £646,000 to Mozambique.

★September milling in Transvaal gold mines was 4,454,000 tons and the working profit £2,021,690, both being decreases on August and July figures. Gold production during September was 952,287 oz., compared with 965,262 oz. in August.

★Although it was indicated in October that Southern Rhodesia would yield to the International Monetary Fund protests and cancel the subsidy to gold producers, a subsequent announcement was to the contrary. According to the London Financial Times the general subsidy on all gold produced in Southern Rhodesia will continue to be paid at least until March 31, 1949.

★New Pioneer Central Rand Gold Mining Co., through its subsidiary, Strathmore Developing Co., has acquired the right to prospect, and option to purchase, about 400 morgen on Hartebeestfontein 41, district Klerksdorp. The area adjoins the southern boundary of Stilfontein 39 and is immediately north of the main railway line.

★Net profits earned by the Johannesburg Consolidated Investment Co., Ltd. for the year ended June 30, 1948, totaled £1,414,609, a decrease compared with £1,827,282 in the previous year. Total proceeds from the sale of gem stones and industrial diamonds in the six months period totaled approximately £22,000,000.

The directors reported lower milling tonnages, lower working profits and lower dividends, accompanied by increased working costs, in the Witwatersrand mining industry.

Arrangements to double the capacity of the Rustenburg platinum mines are well advanced.

★Gem diamonds sold by de Beers Consolidated Mines, Ltd., in the nine months from January through September totaled £21,934,330, of which £14,659,183 was sold between January and June.

Industrial diamonds sold totaled £9,758,147, of which £6,650,980 was sold in the first half of the year.

★In September the New Pioneer Central company reported borehole S.T. 9 on Stilfontein had intersected the Vaal reef at 2,947 ft. and assayed 149.4 dwt. over 9.5 in. equal to 1,419 in.-dwt. The South African press pointed out that this strike will extend the gold mining area of Klerksdorp 10 miles into a section where there have been no mines. It is expected that capital cost in establishing operations will be comparatively low because of the shallow depth.

★South African H. E. Proprietary, Ltd. announce that the third deflection in borehole WLD 1 north of Virginia in the Free State intersected Basal reef at 5,857 ft. and assayed 4.3 dwt. over a corrected width of 52.2 in. (224 in.-dwt.). Leader reef intersected at 5,827 ft. assayed 20 in.-dwt.

★The deflection in borehole LR 2 on farm la Riviera No. 289 north of Virginia, New Free State Gold Estates, Ltd., intersected Basal reef at 5,504 ft., assaying 8.89 dwt. over a corrected width of 40.6 in. (361 in.-dwt.). Leader reef was intersected in a deflection at 5,408 ft. assaying 64 in.-dwt.

AUSTRALIA

Improved yield in concentrates for Aberfoyle Tin—Radioactive ore at E. Mt. Painter—Berringa may resume

WESTERN AUSTRALIA

★Australian gold production for seven months ended July was 38,988 oz., or about 7% less than in the corresponding period of last year. Gold yields in Western Australia also continued to decline. Mint receipts for the first nine months of 1948 were 30,000 oz. lower at 494,053 oz. than in the corresponding period of 1947.

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PIONEER PRODUCERS OF XANTHATES FOR METALLURGICAL USE

Australia (*Continued*)

Wiluna Gold Mines, Ltd., is nearing completion and it is expected that the plant will be shut down early next year. Mining ceased in 1947.

★Recent development work at the North Kalgurli (1912), Ltd. mine has disclosed large bodies of valuable ore in various sections. After treating 152,566 long tons in 1947-48, the mine reported an increase of about 258,000 tons in total ore reserves.

★To insure continuous crushing and the regular monthly returns, Mountain View Gold, N. L., plans to install a jaw crusher, a 5- or 10-head battery, Wilfley table, thickener, leaching vats and zinc boxes. A new 9x4-ft. two-compartment shaft is to be sunk about 500 ft. west of the Mountain View shaft.

NEW SOUTH WALES

★Miners of Lake George Mines at Captain's Flat have struck for a higher lead bonus. Instead of a lead bonus of 8 pence (11c.) a week for every £1 rise in the price of the metal above £45 a ton, the company proposed a profit-sharing plan, but the unions stand pat on demands for adoption of the Mount Isa bonus schedules.

★Due to higher costs and lower output, profit of North Broken Hill, Ltd. for 1947-48 dropped £157,614 from the previous year's record of £1,137,436. Lead in lead concentrate produced in the twelve months amounted to 40,136 tons (47,747 tons in 1946-47), silver in lead concentrate, 1,911,941 oz. (2,148,231 oz.) and zinc in zinc concentrate 29,500 tons (35,255 tons). Ore treated, 316,219 tons, was nearly 10% less than in the preceding year.

NEW ZEALAND

★New Zealand, one of the largest countries to allow its citizens to keep minted gold in the mattress, under a Gold Acquisition Notice has called for all hoardings to be turned over to the dominion's Reserve Bank. Settlement will be in cash or in government securities. The notice covers gold bars, coins, bullion, amalgam, alloys, precipitates, slag, concentrates, tailings and residues, but not articles manufactured of gold.

Because of the recent appreciation of the New Zealand pound to parity with sterling, both producers and hoarders of gold take a 20% loss compared to prices ruling under the old exchange rate. While the government bought gold at the rate of 6¼ shillings per 1/35 oz. (equal to $1.), it now pays only 5 shillings.

SOUTH AUSTRALIA

★An intensely radioactive mineral, believed to be pitchblende, has been recovered from an exploratory shaft at East Mount Painter, site of Australia's wartime uranium extraction plant. The Director of Mines, Mr. S. B. Dickinson, told members of a parliamentary party that the ore had not yet been definitely identified, but it had the radioactive intensity of pitchblende. The mineral, which occurred with other uranium-bearing ores found in the workings, was very finely distributed. Horizontal diamond drills are continuing the search for more uranium.

TASMANIA

★Aberfoyle Tin's new system of payment on contract-mined ore is reflected in higher head values. While the tonnage of ore extracted in 1946-47 was practically the same at about 28,000 tons, the yield in terms of concentrates jumped from 508 tons to 543½ tons. The new payment system has resulted in a reduction of waste rock, with a consequent improvement in the value of ore actually crushed and treated in the mill.

From the 1946-47 profits of £77,390 the company has appropriated £15,000 for expenditure on new plant and development. It has been decided to deepen the main shaft a further 240 ft. and to open up new levels at 747 ft. and 867 ft. Diamond drilling will be undertaken to prove the continuance of the ore veins at depth. It is expected that the shaft and the necessary crosscuts to reach the ore veins worked on upper levels will be completed by the middle of 1949.

★A new personnel practice has been introduced by Electrolytic Zinc Co. of Australasia, Ltd. Coincident with dividend payments to stock holders, employees will share in a bonus pool of £7,500 for each 1% by which the dividend exceeds 3½%, provided that the dividend to common stockholders exceeds 8%. The amount will be divided in proportion to the salaries and wages earned.

A feature of this bonus plan is that employees involved in slow-down practices or refusing to work reasonable overtime, or members of unions which call out employees, will be debarred from sharing in the succeeding distribution. The amount they would have received will not be paid into the pool. In Australia each management has to deal with several unions, since shop unions are not known.

★British Aluminum Co., Ltd., is considering taking an active part in developing an aluminum reduction industry in Tasmania.

VICTORIA

★The Berringa Gold Prospecting Syndicate, in the Ballarat district, is negotiating for formation of a company to resume work at the Berringa mine, an important property until a fire in February this year caused suspension of operations.

★The A1 Consolidated Mine, one of the two major producers in the Beechworth district, crushed 6,090 tons for 10,395 oz. during the first six months of 1948. At Morning Star, the other major mine, high-grade ore is being extracted from stopes above the No. 16 south level. Run-of-mine ore has proved payable, 6,619 tons treated in the six months ended June producing 4,715 oz. of gold and 105 long tons of concentrate of about 2 oz. per ton.

★The new plant installed by Rutherglen Gold Dumps, Ltd. on the Southern No. 1 mine dump is working and returns are reported to be profitable.

★As soon as erection of a 10-head stamp mill is completed at Williams United Mine, the shaft will be deepened for development of the shoot which has been worked successfully at 195-ft. level.

★Nell Gwynne Reefs, Central Nell Gwynne and North Virginia companies, shaft sinking in the Bendigo district, will shortly complete their programs and will then be in a position to develop deeper ground by crosscutting. The Deborah will continue sinking.

★The Wattle Gully Mine at Chewton, in the Castlemaine-Maryborough district, continues to be the only consistent producer in the field. During the first half of 1948, 10,546 tons were crushed for a yield of 4,141 oz. Hydraulic stowage is proving highly successful for stope filling, the sand consolidating perfectly and drying out rapidly.

★South Broken Hill, Ltd. has been granted a lease of a large area at Maldon. A geophysical survey is in progress.

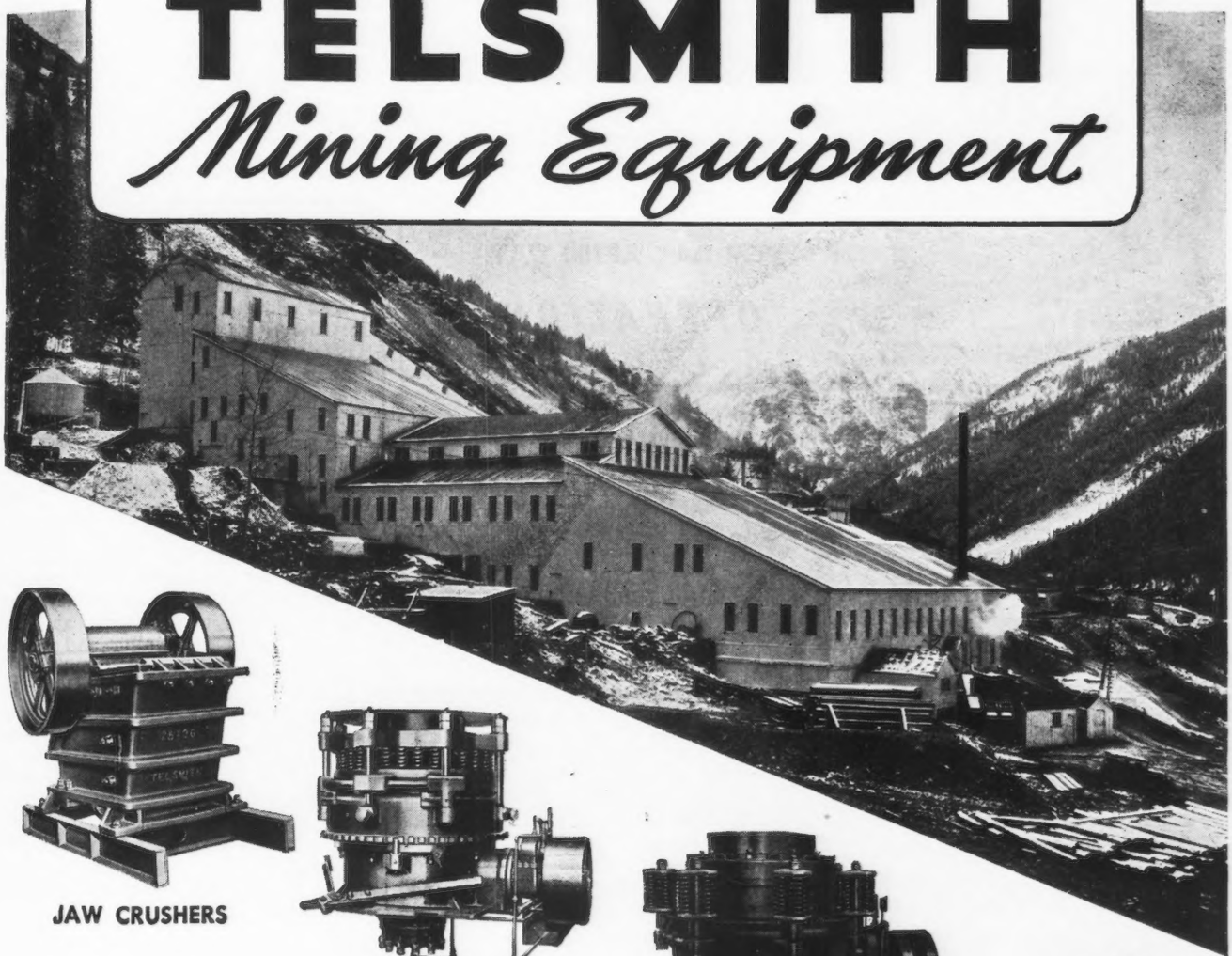
TURKEY

★Allis-Chalmers Manufacturing Co. has contracted to build an 8x10-ft. overflow ball mill for the copper concentrator that Western Knapp Engineering Co. is building for Etibank at the Ergani mine.

SWEDEN

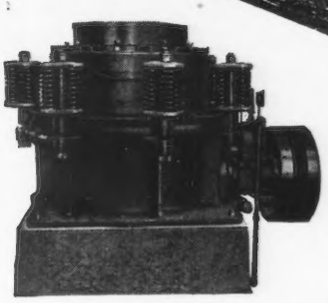
★Two 13x30-ft. copper converters were shipped from Milwaukee, Wis., for installation in Sweden, it was announced by the Allis-Chalmers Manufacturing Co. in October. Both units will be installed at Boliden Gruvaktiebolag, Skelleftea, largest copper refining concern in Scandinavia, and will be in operation in the near future. Complete with hoods and silica chargers, the converters were shipped by boat from the Great Lakes port of Milwaukee.

TELSMITH
Mining Equipment

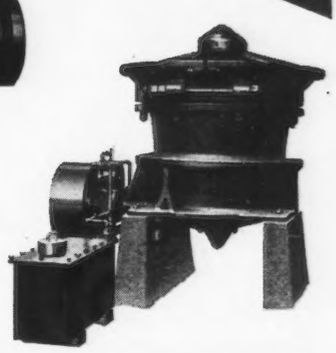


JAW CRUSHERS

GYRASPHERE
SECONDARY CRUSHERS



INTERCONE
SECONDARY CRUSHERS



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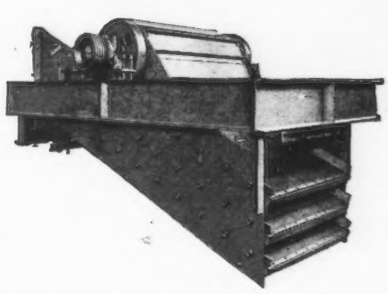

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Write for Equipment Guide E-1

MIN. 16-R

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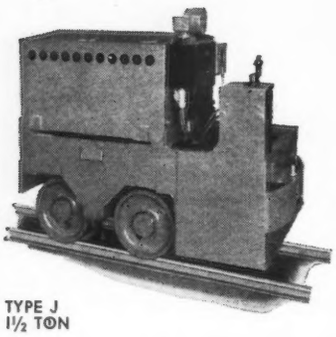
Mussens Canada Ltd. Toronto, Ont.—Montreal 3, P.Q.
Gordon Russell, Ltd., Vancouver, B. C.

ATLAS



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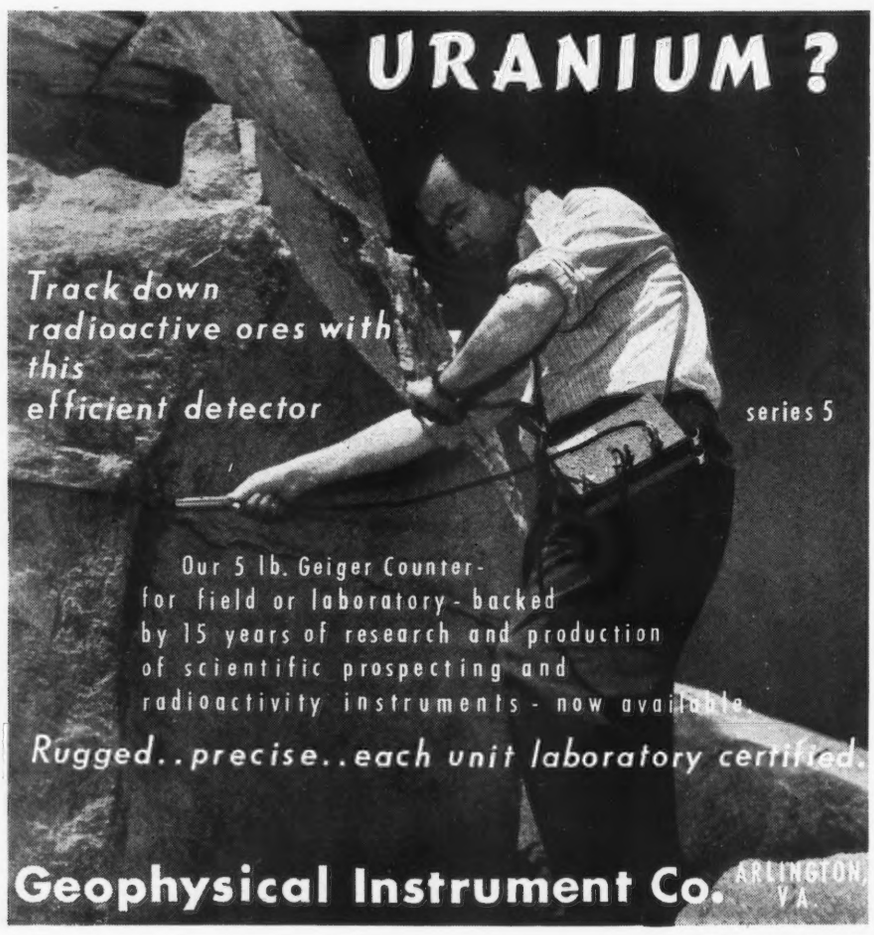

Personal News

(*Continued from p.* 125)

new Fraser & Chalmers, Limited.

Recently I worked out estimates for equipping and operating a new mining enterprise in Mexico. Of a total of $1,500,000 required, $1,200,000 was allocated to the purchase and railway freight cost in the United States of machinery, etc. Furthermore the continued operation of the enterprise called for the yearly purchase of $350,000 of supplies and services, from our side of the line.

Tax collectors of all countries fight for the lion's share of the *profits*. These are always much less than the money value of the business going to the shops and ships. In all my American mining work I have never been asked: "How much business will this enterprise create for our factories and railways?" Always it has simply been: "What earnings will you make?"

Our domestic mining industry is not waning. Our mining men are as skillful as any others (formerly they were the acknowledged leaders), and our manufacturers of mining and metallurgical machinery and supplies are the largest and equal to the best. To keep the industry and the manufacturers working full time it is necessary to provide working capital for expansion of the industry. Of such new capital the factories and the railways invariably are the main recipients. But I have never heard of any participation by them in putting up the venture capital. In England such interests do.

The 10 or 12 mining groups in the U. S. A. which have hitherto been the principal buyers of newly developed mines are snowed under with their own rehabilitation and expansion work. Furthermore, their practice of taking such outside properties into their corporate laps has tended to reduce public participation in mining, which I, for one, believe is regrettable.

A study of our corporate earnings and reserves gives the impression that the tangible source of venture capital is in the corporations. Savings bank deposits are very large, but the S. E. C. has fenced them in and the tax collector has impoverished our wealthy individuals.

A logical solution of the problem would be the organization of mining finance companies by the corporations, the equipment and supplies manufacturers and the railways, all of whom are the principal recipients and beneficiaries.

If such finance companies were created, the mining promoter would become a respected provider of new business as he is in England, instead of a "pariah." Under such conditions, offerings of working capital shares to the public might receive the approval and cooperation of the S.E.C.

Why not put it up to the corporations?

R. M. ATWATER, JR.
Chadd's Ford, Pa.

MARKETS—Trends and Prices

Miscellaneous Metals

(Monthly Averages)

Average prices of miscellaneous metals for November and December:

	Nov.	Dec.
Quicksilver, N. Y. flask	79.636	79.000
Antimony (a)	36.030	36.030
Antimony, bulk, Laredo	33.000	33.000
Antimony, in cases, Laredo	33.500	33.500
Antimony, Chinese (b)	.....	.....
Platinum, oz. troy	62.000	65.692
Cadmium (c)	175.000	175.000
Cadmium (d)	177.500	177.500
Cadmium (e)	180.000	180.000
Aluminum ingot	15.000	15.000
Magnesium	20.500	20.500

(a) New York, packed in cases, in lots of 5 tons or more but less than a carload. (b) Nominal. (c) Producer's price for commercial sticks. (d) Average producers' and platers' quotations. (e) Special shapes sold to platers.

E. & M. J. Weighted Index of Non-Ferrous Metal Prices

100 is composite for 1922-3-4. (Copper, Lead, Zinc, Tin, Silver, Nickel, Aluminum)

1937	90.86	1942	86.80
1938	73.67	1943	88.74
1939	77.71	1944	88.74
1940	79.22	1945	90.86
1941	83.49	1946	110.057

	1945	1946	1947
January	88.74	96.42	140.88
February	88.74	96.42	140.42
March	88.74	96.42	150.71
April	88.74	96.42	153.14
May	88.74	96.42	154.03
June	88.74	107.16	150.05
July	88.74	117.11	148.73
August	88.74	113.32	149.35
September	91.16	113.32	150.80
October	96.40	114.25	151.05
November	96.42	131.23	151.92
December	96.42	142.19	152.48

Official London Prices

Since Dec. 18, 1939, the British Ministry of Supply has named maximum delivered prices for the major non-ferrous metals. Prevailing delivered prices for consumers in the United Kingdom follow:

	Per Long Ton		
COPPER:	£	s.	d.
Electrolytic, high conductivity	132	0	0
Fire refined, high conductivity	132	0	0
Fire refined, high grade	131	10	0
Fire refined, min. 99.2 percent	131	0	0
Fire refined, min. 99.7	130	10	0
Hot rolled black wire rods	138	0	0
LEAD:			
Soft, foreign, duty paid	90	0	0
Soft, Empire	90	0	0
English refined	91	10	0
ZINC:			
Foreign (G.o.b.), duty paid	70	0	0
Domestic (G.o.b.)	70	0	0
Prime Western and debased	70	0	0
Refined and electrolytic	70	15	0
Minimum 99.99 percent	72	5	0
TIN:			
Ingot, 99 percent	510	0	0

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipment, f.o.b. New York, unless otherwise stated

MISCELLANEOUS METALS

(December 31, 1947)

Aluminum, ingot, 99 plus percent, lb.	15c.
Antimony, spot, lb., 5 tons and up but less than carload, in cases	36.03c.
Bismuth, ton lots, lb.	$2.00
Cadmium, commercial sticks, lb.	$1.75
Calcium, lb. ton lots, 98 percent, cast	$1.85
Chromium, 97 percent grade, lb.	39c.
Cobalt, 97 to 99 percent, per lb.	1.65
Indium, troy oz.	$2.25
Nickel, electrolytic cathodes, lb. (effective Jan. 1, 1948)	33¾c.
Magnesium, 99.8 percent, carloads, lb.	20½c.
Palladium, troy oz.	$24.00
Platinum (Official quotation wholesale lots) troy oz.	$66.00
Quicksilver, flask of 76 lb., 25 flasks or more	$79.00
Selenium, 99.5 percent, lb.	$2.00
Silicon, minimum 97 percent, spot, carloads, lb.	14.75c.
Tellurium, lb.	$1.75 nom.
Thallium, 100 lb. or more, lb.	$15.00
Titanium, 96 to 98 percent, lb.	$6.00@$7.00

METALLIC ORES

Beryllium Ore, 8 to 12% BeO, f.o.b. mine, per unit	$14.00@$16.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry 48% Cr_2O_3, 2.8 to 1 ratio	$37.50
48% Cr_2O_3, 3 to 1 ratio	$39.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer	$5.95
Mesabi bessemer	$5.70
Old Range non-bessemer	$5.80
Mesabi, non-bessemer	$5.55
Lead (Galena) 80 percent, Joplin, Mo., ton	$195.65
Manganese Ore—Per long ton unit of Mn, basis 48 percent manganese, subject to premiums and penalties, f.o.b. cars Atlantic and Gulf ports, duty paid, 65@67c.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	45c.
Tungsten Ore, per unit of WO_3:	
Foreign, 60 percent, duty paid	$30.00
Domestic, scheelite, 60 percent and upward	$30.00
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	27½c.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$70.35

METALLIC COMPOUNDS

Arsenious Oxide (arsenic trioxide) lb., in bbl., carload lots, effective Jan. 1, 1948	6¼c.
Cobalt Oxide, 70 to 71 percent, lb.	$1.27½
Copper Sulphate, 100 lb.	$7.60

ALLOYS

Beryllium Copper, 2.5 to 3 percent Be, per lb. of contained Be	$14.75
Ferrochrome, 65 to 70 percent, per lb. of Cr contained	15.60c.
Ferromanganese, 78 to 82 percent, gross ton	$150.00
Ferromolybdenum, 55 to 65 percent Mo, lb. of Mo contained	95c.
Ferrosilicon, 50 percent, per lb. of contained Si	7.80c.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$2.50
Ferrovanadium, per lb. of V delivered	$2.90
Silicomanganese, 1½ percent C, per lb., contracts	7.40c.

NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U.S funds), ton:	
Crude No. 1	$800
Crude No. 2	$302@$410
Spinning fibers	$170@$230
Paper stock	$43@$65
Shorts	$20@$38
Vermont, f.o.b. Hyde Park:	
Shingle stock	$82.50@$91.50
Paper stock	$58.00@$65.00
Waste	$43.00
Refuse or shorts	$20.50@$38.50
Barytes, f.o.b. mines:	
Georgia, crude, per long ton	$11.50@$12.00
Missouri, 93 to 94 percent $BaSO_4$, per short ton	$9.00@$9.50
Bauxite, long ton:	
Domestic, crude, 50 to 52 percent (not dried)	$4.00@$5.00
Domestic, chemical, 55 to 58 percent	$7.50@$8.50
Domestic, abrasive, 80 to 84 percent	$16.50
China Clay, f.o.b. mines, ton:	
South Carolina and Georgia, No. 1, airfloated, bulk	$6.75@$8.00
Maryland, ball, bulk	$7.00@$9.00
Feldspar, bulk ton:	
Potash feldspar, 200 mesh	$17.00
Glass spar, white, 20 mesh	$11.75
Fluorspar, f.o.b. mines, bulk, Kentucky and Illinois 70 percent, all rail movement, ton	$35.00
Acid 97 and 1 percent, bulk, ton	$40.00
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00@$14.00
Magnesite, per ton dead-burned, f.o.b. Washington	$24.00
Mica—Domestic f.o.b. mines. Punch, 6 to 15c. per lb. according to size and quality. Sheet, clear, 1½x2 inch, 60 to 65c.; 2x2 inch, 95c. to $1; 2x3 inch, $1.35; 3x3 inch, $1.80; 3x4 inch, $2.25; 3x5 inch $3; 4x6 inch, $4; 6x8 inch, $6. Wet ground, very fine, $90 per ton. Bulk sales, dry ground, $32.50 per ton. Scrap, 28 and up, depending on quality.	
Ocher, Georgia, ton, in sacks	$24.00
Pyrites, Spanish, per long ton unit of S, cif. Atlantic ports	12@14c.
Silica, in bags, 325 mesh, ton	$20.00@$40.00
Sulphur, Texas, mines, long ton	$16.00@$18.00
Talc, f.o.b. works, ton:	
New York, air-floated, 325 mesh	$18.50@$20.00
Vermont, extra white, 200 mesh	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$14.50

IRON AND STEEL

Pig Iron, Valley furnaces, gross ton: Basic	$36.00
Steel, base price, Pittsburgh Billets, gross ton	$47.50
Structural shapes, 100 lb.	$2.80

MARKETS—Trends and Prices

in the United States market since the middle of November 1946. The fact that Prime Western zinc sold in the export market at 10¾c. per pound, f.a.s. Gulf ports, only added to the strength of the situation here. Demand for zinc from galvanizers and die casters was active throughout the period.

The November statistics of the American Zinc Institute placed stocks on hand at the end of the month at only 69,166 tons, against 79,273 tons a month previous and 136,574 tons at the end of September. Withdrawal of zinc by the Government was responsible for the decline in stocks.

Quicksilver was only moderately active and spot metal held at $79 per flask throughout December. On forward business, covering round lots, there were sellers at $76 to $78 per flask. However, there was no real selling pressure at these prices.

Tungsten ore prices steadied as it became known that the mineral would not be among the items on which lower import duties went into effect on Jan. 1, 1948. Ore of good quality brought $30 per unit, duty paid.

Antimony remained strong. As in Tungsten ore, no action was taken in reference to the existing rate of duty. Until the country that asked for the cut in the tariff signs the Geneva agreement, the duty on the metal and the oxide will continue at 2c. per pound.

Arsenic tri-oxide, in barrels, carload lots, was advanced one-quarter cent to 6¼c., effective Jan. 1, 1948.

Yearly Averages

	1946	1947
Copper, domestic, refinery	13.820	20.958
Copper, export refinery	14.791	21.624
Lead, New York	8.109	14.673
Lead, St. Louis	7.957	14.470
Zinc, St. Louis	8.726	10.500
Tin, Straits	54.544	77.949
Silver, foreign	80.151	71.820
Quicksilver (per flask)	$98.241	$83.742
Antimony, New York	17.306	34.852
Platinum, refined	$57.199	$59.087
Cadmium	109.022	171.780
Aluminum, 99 plus, ingot	15.000	15.000
Magnesium, ingot	20.500	20.500

Major Metals

U. S. DAILY AND AVERAGE PRICES

Dec. 1947	Electrolytic Copper: Domestic (a) Refinery	Electrolytic Copper: Export (b) Refinery	Straits Tin: New York	Lead: New York	Lead: St. Louis	Zinc: East St. Louis
1	21.200	21.500	80.000	15.000	14.800	10.500
2	21.200	21.500	80.000	15.000	14.800	10.500
3	21.200	21.525	80.000	15.000	14.800	10.500
4	21.200	21.425	80.000	15.000	14.800	10.500
5	21.200	21.575	80.000	15.000	14.800	10.500
6	No Market	21.525	80.000	15.000	14.800	10.500
8	21.200	21.550	80.000	15.000	14.800	10.500
9	21.200	21.675	80.000	15.000	14.800	10.500
10	21.200	21.425	80.000	15.000	14.800	10.500
11	21.200	21.550	80.000	15.000	14.800	10.500
12	21.200	21.575	80.000	15.000	14.800	10.500
13	No Market	21.425	80.000	15.000	14.800	10.500
15	21.200	21.450	80.000	15.000	14.800	10.500
16	21.200	21.475	80.000	15.000	14.800	10.500
17	21.200	21.425	80.000	15.000	14.800	10.500
18	21.200	21.425	80.000	15.000	14.800	10.500
19	21.200	21.525	94.000	15.000	14.800	10.500
20	No Market	21.425	94.000	15.000	14.800	10.500
22	21.200	21.475	94.000	15.000	14.800	10.500
23	21.200	21.525	94.000	15.000	14.800	10.500
24	21.200	21.425	94.000	15.000	14.800	10.500
25	Holiday	Holiday	Holiday	Holiday	Holiday	Holiday
26	21.200	21.425	94.000	15.000	14.800	10.500
27	No Market	21.425	94.000	15.000	14.800	10.500
29	21.200	21.550	94.000	15.000	14.800	10.500
30	21.200	21.475	94.000	15.000	14.800	10.500
31	21.200	21.425	94.000	15.000	14.800	10.500
AVERAGES FOR MONTH						
Dec.	21.200	21.488	85.385	15.000	14.800	10.500
AVERAGES FOR WEEK						
Dec.						
3	21.200	21.492	80.000	15.000	14.800	10.500
10	21.200	21.529	80.000	15.000	14.800	10.500
17	21.200	21.483	80.000	15.000	14.800	10.500
24	21.200	21.467	91.667	15.000	14.800	10.500
31	21.200	21.460	94.000	15.000	14.800	10.500
CALENDAR WEEK AVERAGES						
Dec.						
6	21.200	21.508	80.000	15.000	14.800	10.500
13	21.200	21.533	80.000	15.000	14.800	10.500
20	21.200	21.454	84.667	15.000	14.800	10.500
27	21.200	21.455	94.000	15.000	14.800	10.500

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

Dec. 1947	Sterling Exchange "Checks"	Silver: (e) New York	Silver: London	Gold: London	Gold: (d) United States
1	402.750	74.625	45.000d.	172s. 3d.	$35.000
2	402.750	74.625	45.000d.	172s. 3d.	35.000
3	402.750	74.625	45.000d.	172s. 3d.	35.000
4	402.750	74.625	45.000d.	172s. 3d.	35.000
5	402.750	74.625	45.000d.	172s. 3d.	35.000
6	(e)	(e)	(e)	(e)	35.000
8	402.750	74.625	45.000d.	172s. 3d.	35.000
9	402.750	74.625	45.000d.	172s. 3d.	35.000
10	402.750	74.625	45.000d.	172s. 3d.	35.000
11	402.750	74.625	45.000d.	172s. 3d.	35.000
12	402.750	74.625	45.000d.	172s. 3d.	35.000
13	(e)	(e)	(e)	(e)	35.000
15	402.750	74.625	45.000d.	172s. 3d.	35.000
16	402.750	74.625	45.000d.	172s. 3d.	35.000
17	402.750	74.625	45.000d.	172s. 3d.	35.000
18	402.750	74.625	45.000d.	172s. 3d.	35.000
19	402.750	74.625	45.000d.	172s. 3d.	35.000
20	(e)	(e)	(e)	(e)	35.000
22	402.750	74.625	45.000d.	172s. 3d.	35.000
23	402.750	74.625	45.000d.	172s. 3d.	35.000
24	402.750	74.625	45.000d.	172s. 3d.	35.000
25	Holiday	Holiday	Holiday	Holiday	Holiday
26	402.750	No market	Holiday	Holiday	35.000
27	(e)	(e)	(e)	(e)	35.000
29	402.750	74.625	45.000d.	172s. 3d.	35.000
30	402.750	74.625	45.000d.	172s. 3d.	35.000
31	402.750	74.625	45.000d.	172s. 3d.	35.000
AVERAGES FOR MONTH					
Dec.	402.750	74.625	45.000d.	—	35.000
AVERAGES FOR WEEK					
Dec.					
3	402.750	74.625	—	—	—
10	402.750	74.625	—	—	—
17	402.750	74.625	—	—	—
24	402.750	74.625	—	—	—
31	402.750	74.625	—	—	—

Calendar week averages, New York Silver: Dec. 6th, 74.625; 13th, 74.625; 20th, 74.625; 27th, 74.625.

(e) No market (Saturday)

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300c. per pound, the average differential for delivery charges effective Oct. 14.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075c. for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingot bars; cathodes are sold at a discount of 0.125c.

Quotations for zinc are for ordinary Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered in the East and Middle West in nearly all instances command a premium of 1c. per pound over the current market for Prime Western but not less than 1c. over the *Engineering and Mining Journal's* average quotation for Prime Western for the previous month; the premium on Special High Grade in most instances is 1¼c.

Quotations for lead are for common lead.

(c) Determined by Handy & Harman on the basis of market prices for bar silver, in cents per troy ounce .999 fine, in amounts of 50,000 oz. or more, nearby delivery, New York. Price quoted is in cents and one-eighth cent fractions, and is usually about one-quarter cent below the market to allow for delivery, carrying, and marketing. In addition to foreign silver, the quotation also applies to domestic and Treasury silver if such silver enters into the market. The Treasury's purchase price of newly mined domestic silver **90.5c. per troy ounce 1000 fine, effective July 1**, 1946. London silver in pence per troy ounce, basis .999 fine.

(d) U. S. Treasury's gold price. Actual payment by the United States Treasury for gold in domestic and imported ore or concentrate is at 99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

MARKETS — Trends and Prices

Tin Advanced Sharply to Offset Higher Costs — Copper and Lead Active — Zinc Position Strong

INDUSTRIAL OUTPUT IN DECEMBER continued at a high rate. Consumers of major non-ferrous metals showed no signs of nervousness and were willing to accumulate sufficient tonnages to carry them well into 1948. Though the statistics for December may not compare quite so favorably with those of the two preceding months, the holiday period and transportation bottlenecks were factors in retarding shipments. Consumers were in the market for copper, lead, and zinc for delivery over the first quarter of the year. The E&MJ index of non-ferrous metal prices for December was 152.48, against 151.92 for November. The rise resulted from a sharp upward adjustment in the price of tin.

The advance in tin was foreshadowed by widespread dissatisfaction at producing centers with the price-fixing policy of government officials. Inflation has lifted the cost of producing tin in all important mining areas, it was argued, and prices would have to rise to stimulate output. Early in December it was rumored that the British authorities intended to correct the situation around the middle of the month. On Dec. 17, the Ministry of Supply posted a price for Standard tin for the home market of £510 per long ton, equivalent to roughly 94c. for Straits tin. At the same time, consumer restrictions for purchasing tin were withdrawn. Effective Dec. 19, the Tin Sales Corporation advanced its schedule of prices for the United States market to the basis of 94c. per pound for Grade A or Straits quality tin.

In raising the price 14c. per pound, the domestic market for tin moved up to the highest level recorded since 1918. The revised schedule of prices is to prevail "until further notice." New quotations follow:

	Per Pound.
Grade A	94c.
Grade B	93.85c.
Grade C	93.50c.
99% to 99.64%	(a) 93.50c.
98% to 98.60%	(a) 92.60c.

(a) For tin content.

The price action in tin, initiated in London, had a pronounced influence on the negotiations for a new contract with the Bolivian group of producers. On Dec. 31, it was announced in Washington that the Reconstruction Finance Corporation agreed to purchase Bolivian concentrates on the basis of 90c. per pound, South American ports, against the previous settlement basis of 76c. The new contracts cover 1948 and 1949, and the price is subject to change in the event that the quotation of Grade A tin in the New York market fluctuates. The agreement covers production by the same group that participated in the 1947 program, with the exception of some 8,000 tons a year that may go to Argentina.

As December ended it was thought in market circles here that another 10 percent interim boost in freight rates allowed by the Interstate Commerce Commission would bring about some adjustments in the delivered prices of various metals after Jan. 5, 1948, the effective date of the new schedule. Producers were pleased on learning that special exemption has been granted on ores and concentrates of iron, aluminum, copper, lead, and zinc, in that the increase allowed will be limited to 20c. per ton over the rates in effect early in October. On these metals, including scrap, the increase was restricted to not more than 11c. per 100 lb.

Copper maintained its firm position right up to the end of the year, and there were no indications of a change for some months ahead. In fact, consumers purchased the metal for January shipment at about the same high rate as in the fourth quarter period. Domestic consumption of copper, based on statistics compiled for the fabricating division of the industry, totaled 105,704 tons in November, against 121,704 tons in October. The decline that occurred in November occasioned little comment from the trade because the bulge in consumption in the preceding month was viewed as abnormal, correcting a slump that took place in July and August. Consumption of copper in this country in the Jan.-Nov. period of 1947 averaged 111,685 tons a month, against an average of 102,760 tons a month for all of 1946. So far as the first half of 1948 is concerned, most observers look for consumption to average around 105,000 tons a month.

Inquiry for copper from foreign consumers was fairly active, but business was hampered because of the continued shortage in dollar exchange. Copper sold in the export market at prices varying between 21½c. and 21¾c., f.a.s. New York equivalent.

The United Kingdom consumed 32,079 tons of primary copper in November, making the total for the Jan.-Nov. period 322,680 tons. Stocks of refined copper in the hands of the British Ministry of Supply on Oct. 1 were estimated at 96,300 tons.

Mine output of lead in the United States in 1948 will total around 425,000 tons, according to an estimate by Andrew Fletcher, president of St. Joseph Lead Co. Return of scrap to the market for the year should amount to 400,000 tons, he believes. With consumption of lead (primary and secondary) estimated at 1,000,000 tons, it will be necessary to import 175,000 tons of lead in 1948.

Consumers of lead purchased all of the metal in December that was available from producers. In addition, they were able to obtain around 3,000 tons from the Government's greatly reduced reserve. Though the price is looked upon as being too high for the long-term good of the industry, the undertone was firm throughout the month and is likely to remain so until offerings increase or the buying wave diminishes.

Zinc was in the limelight as the year ended on signs that the price structure was gaining sufficient strength to bring about an upward adjustment in the 10½c. quotation that has prevailed

Copper Statistics

The following summary of copper statistics reported by members of the Copper Institute embraces the operations of the group in the United States as well as outside of this country. Deliveries in the United States are made up of both domestic and foreign origin metal. All figures are in short tons.

UNITED STATES

	July	Aug.	Sept.	Oct.	Nov.	11 Months Jan.-Nov.
Crude production:						
Primary	72,498	75,547	73,581	69,127	64,901	797,748
Secondary	6,654	7,754	10,134	7,173	6,960	96,601
Totals	79,152	83,301	83,715	76,300	71,861	894,349
Refined production	94,610	88,122	92,146	108,277	97,525	1,087,577
Deliveries	109,822	96,374	95,640	112,310	106,232	1,270,220
Stocks, refined	77,773	77,212	80,133	74,507	66,622	.....

OUTSIDE UNITED STATES

Crude production:						
Primary	94,948	85,780	105,244	108,266	101,454	1,125,950
Secondary	953	839	988	1,036	531	7,473
Totals	95,901	86,619	106,232	109,302	101,985	1,133,423
Refined production	73,950	73,673	88,882	87,548	82,726	929,538
Deliveries	68,827	63,370	74,093	79,277	87,398	843,135
Stocks, refined	138,339	138,639	145,581	154,590	148,824	.....

output in October, however, was 12% below that in the first half of 1947.

According to the information obtained 58 mines that produced some zinc had closed directly or indirectly because of the expiration of subsidy payments. Of this total, 15 mines closed in the Western States, 2 in the Eastern States, and 41 in the Central States, 38 of which were in the Tri-State district. Zinc production from these mines averaged 4,600 tons monthly in 1946 and nearly 4,800 tons in 1947, of which 3,720 and 3,750 tons, respectively, were from the Tri-State district.

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The 31-member council, created at the invitation of Secretary of the Interior, Julius A. Krug, will advise him on the policy and program relating to the mineral supply position of the United States. Representatives of both the extractive and processing industries throughout the country, large and small, make up the council.

Donald H. McLaughlin, president of Homestake Mining Co., was elected chairman of the council. Six commodity committees, each headed by a vice-chairman, were established. They are: ferrous metals, Alexander C. Brown of Cleveland, president of Cleveland Cliffs Iron Co.; copper metals, Robert G. Page of New York, president of Phelps Dodge Corp.; lead-zinc metals, H. I. Young of St. Louis, president of American Zinc, Lead and Smelting Co.; precious metals, Mr. McLaughlin; alloy metals, W. J. Priestley of New York, Union Carbide and Carbon Corp.; industrial minerals (including light metals), H. M. Albright of New York, president of U. S. Potash Co. C. K. Leith of Washington, D. C., was elected vice-chairman at large.

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NLRB Adheres to T-H Law in Handling Communist Unions

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Before any agreement is reached, a hearing somewhat similar to those under the old National Recovery Act will be held. Affected industries and labor will get a chance to state their views.

New Premium Price Plan Is Considered Probable

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It had not been decided by year's end just what form the new premium plan would take. One idea, which appeared to have the best chances, would be to authorize a subsidy for copper, lead, zinc, cadmium, manganese, chromite, antimony, tungsten, mercury, vanadium, fluorspar, and several other important metals and minerals. The production resulting from the subsidy would go into the military stockpile.

Another idea, an amended Russell bill, would provide a subsidy for "strategic and critical materials," leaving the selection of the allowable list of minerals up to the director of the plan. Subsidized production would be stockpiled.

Even before Congress had gone into regular session, minerals experts in Washington were predicting passage of a minerals subsidy before June. They think political pressure will prevent a veto before election.

WASHINGTON REFLECTIONS

State Department Plans Buying Foreign Minerals

The State Department has come up with two plans—one made public and one still unpublicized—for stimulating European mineral production.

In the tentative Marshall Plan outline, released Christmas week, the Department proposed that Europeans under the plan should sell any surplus strategic materials to the American military stockpile "at reasonable prices." Payment would be in dollars. This is the publicly promulgated idea.

On the inside, Marshall Planners are working on an idea for Europe and its colonies that would combine idle labor and undeveloped deposits of strategic materials – plus American funds – to provide an increased output of material for the stockpile here. The costs of the operations would be charged against the Marshall plan. The material would come to the stockpile free.

State's publicized proposal, by calling for purchase, is different from the "repayment by stockpiling" idea which was brought out by the Harriman committee (*E&MJ*, December, p. 82). Earlier explanation of the stockpiling idea was that any repayment, which would give us something back for our $17,000,000,000 outlay, would come only after the foreign countries had been put back on their feet, and then only from any increase over prewar output which results from American aid.

The report on stockpiling and foreign aid by the House Select (Herter) Committee on Foreign Aid echoed this premise. The report pointed out that most of the important tonnages and materials would come from colonies and possessions of European nations, rather than from the mother countries themselves. Four tables in the report, showing possible availability of metals and minerals from expanded production in British, French, Belgian, Dutch and other empires and colonies, show a total of $142,235,000 a year which could be purchased by this country.

The House committee report envisions trade on a 25-year contract between the U. S. and the foreign producers. The metals and minerals involved include asbestos, bauxite, chromite, cobalt, copper, cryolite, diamonds, graphite lead, manganese ore, mica, mercury, nickel, platinum metals, talc, tantalum-columbium ore, tin, tungsten ore, vanadium oxide, and zinc. The report also lists corundum, beryllium ore, tantalum ore, kyanite, uranium, and cadmium as "possibilities."

Prices the U. S. would pay for these minerals, as estimated by the report, are all substantially below present market levels. They include 15c. copper, 10c. lead, 8c. zinc, 55c. tin, 60c. tungsten, $60 mercury (flask), and $1 vanadium oxide (pound).

Experts in the State Department point out that any siphoning of important materials away from Europe during the rehabilitation process, unless there is no use for them abroad, would simply cripple reconstruction of foreign economies.

The vague nature of the State Department report and replies to queries give the impression that the minerals aspects of their proposals are simply "window dressing" to lessen Congressional resistance to the Marshall Plan. The attitude of the Herter Committee, on the contrary, stems from a genuine desire to get something back from Marshall Plan outlays.

Whatever State finally brings out in the way of a stockpiling proposal is due for very critical scrutiny in Congress.

Copper, Iron Ore, Smelting Per-Man Outputs Less in '46

Production of recoverable copper per man-hour declined sharply during 1946 to the lowest it has been since 1938.

Production of iron ore per man-hour also declined about five percent in 1946.

These facts are disclosed in two studies of the Bureau of Labor Statistics on productivity and unit labor costs in the copper mining and iron mining industries for the years 1935-1946.

"The long term upward trend of output per man-hour is due mainly to technical improvements in industrial organization and processes," according to BLS. "At any time, however, output per man-hour also depends on such factors as the rate of operations, the relative contributions to production of plants at different levels of efficiency, the types of resources and materials available, as well as the skill and effort of the work force, the efficiency of management, and the state of labor relations."

Production of recoverable copper rose to an index of 150.8 in 1943, then skidded to 133.9, 106 and 82.6 in the three succeeding years. Employment, man-hours and payrolls also dropped in like fashion. At the same time, unit labor costs jumped from 135.7 in 1945 to 173.5.

In iron mining, production reached a peak index of 202.7 in 1942, then fell steadily to 194.5, 180.8, 169.8 and, in 1946, 136.7. Workers, man-hours, payrolls, output per worker and per man-hour also dropped. Unit labor costs, on the other hand, rose from 125.1 in 1945 to 148.9.

Output per man-hour in primary smelting of copper, zinc and lead was one percent less during 1946 than it was during 1945.

Bureau of Mines Studies Effect of Premium Losses

Copper production in the United States fell seven percent in October, almost entirely because of a strike at the Utah mine of Kennecott Copper Corporation, according to the Bureau of Mines. [The strike ended early in November—Ed.] Mine output in October was estimated at 65,745 tons, against 70,470 tons in September and 72,100 tons in August.

An effort to gage the effects of the expiration of the Premium Price Plan has been made by the Bureau. Various factors, of course, tend to complicate determinations as to the causes of mine closings. Sometimes a combination of factors is responsible; and in some instances mines that require premiums for long-term operation have remained in production until an already developed stope was exhausted, or in the hope that an early reinstatement of premium payments in some form would make a costly shutdown unnecessary. The study indicates that 16 mines that produced some copper had closed by the last of October because of the end of premium payments. Copper production in these mines averaged 540 tons monthly in 1946, and 700 tons in 1947.

Lead production from United States mines increased seven percent in October and was the largest monthly output since April 1947. The average daily production rate was 39 short tons (four percent) greater in October than in September. Output in the Eastern States remained virtually unchanged from September, whereas lead production in the Central and Western states gained 13% and four percent, respectively.

According to the information obtained, 51 mines that produced some lead had closed directly or indirectly because of the expiration of subsidy payments. Lead production from these mines averaged 560 short tons monthly in 1946 and 600 tons in 1947. Most of these mines produced zinc in addition to lead and the termination of subsidy payments on zinc output was, for the most part, the determining factor in closing.

The average daily rate of zinc production from domestic mines in October rose four percent, continuing the general advance in output since July 1947. October zinc production, in terms of recoverable metal, was 50,643 short tons, an average of 1,634 tons per day compared with 47,126 tons in September produced at an average rate of 1,571 tons per day. The average daily

output in October, however, was 12% below that in the first half of 1947.

According to the information obtained 58 mines that produced some zinc had closed directly or indirectly because of the expiration of subsidy payments. Of this total, 15 mines closed in the Western States, 2 in the Eastern States, and 41 in the Central States, 38 of which were in the Tri-State district. Zinc production from these mines averaged 4,600 tons monthly in 1946 and nearly 4,800 tons in 1947, of which 3,720 and 3,750 tons, respectively, were from the Tri-State district.

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State Department Plans Buying Foreign Minerals

The State Department has come up with two plans—one made public and one still unpublicized—for stimulating European mineral production.

In the tentative Marshall Plan outline, released Christmas week, the Department proposed that Europeans under the plan should sell any surplus strategic materials to the American military stockpile "at reasonable prices." Payment would be in dollars. This is the publicly promulgated idea.

On the inside, Marshall Planners are working on an idea for Europe and its colonies that would combine idle labor and undeveloped deposits of strategic materials – plus American funds – to provide an increased output of material for the stockpile here. The costs of the operations would be charged against the Marshall plan. The material would come to the stockpile free.

State's publicized proposal, by calling for purchase, is different from the "repayment by stockpiling" idea which was brought out by the Harriman committee (*E&MJ*, December, p. 82). Earlier explanation of the stockpiling idea was that any repayment, which would give us something back for our $17,000,000,000 outlay, would come only after the foreign countries had been put back on their feet, and then only from any increase over prewar output which results from American aid.

The report on stockpiling and foreign aid by the House Select (Herter) Committee on Foreign Aid echoed this premise. The report pointed out that most of the important tonnages and materials would come from colonies and possessions of European nations, rather than from the mother countries themselves. Four tables in the report, showing possible availability of metals and minerals from expanded production in British, French, Belgian, Dutch and other empires and colonies, show a total of $142,235,000 a year which could be purchased by this country.

The House committee report envisions trade on a 25-year contract between the U. S. and the foreign producers. The metals and minerals involved include asbestos, bauxite, chromite, cobalt, copper, cryolite, diamonds, graphite lead, manganese ore, mica, mercury, nickel, platinum metals, talc, tantalum-columbium ore, tin, tungsten ore, vanadium oxide, and zinc. The report also lists corundum, beryllium ore, tantalum ore, kyanite, uranium, and cadmium as "possibilities."

Prices the U. S. would pay for these minerals, as estimated by the report, are all substantially below present market levels. They include 15c. copper, 10c. lead, 8c. zinc, 55c. tin, 60c. tungsten, $60 mercury (flask), and $1 vanadium oxide (pound).

Experts in the State Department point out that any siphoning of important materials away from Europe during the rehabilitation process, unless there is no use for them abroad, would simply cripple reconstruction of foreign economies.

The vague nature of the State Department report and replies to queries give the impression that the minerals aspects of their proposals are simply "window dressing" to lessen Congressional resistance to the Marshall Plan. The attitude of the Herter Committee, on the contrary, stems from a genuine desire to get something back from Marshall Plan outlays.

Whatever State finally brings out in the way of a stockpiling proposal is due for very critical scrutiny in Congress.

Copper, Iron Ore, Smelting Per-Man Outputs Less in '46

Production of recoverable copper per man-hour declined sharply during 1946 to the lowest it has been since 1938.

Production of iron ore per man-hour also declined about five percent in 1946.

These facts are disclosed in two studies of the Bureau of Labor Statistics on productivity and unit labor costs in the copper mining and iron mining industries for the years 1935-1946.

"The long term upward trend of output per man-hour is due mainly to technical improvements in industrial organization and processes," according to BLS. "At any time, however, output per man-hour also depends on such factors as the rate of operations, the relative contributions to production of plants at different levels of efficiency, the types of resources and materials available, as well as the skill and effort of the work force, the efficiency of management, and the state of labor relations."

Production of recoverable copper rose to an index of 150.8 in 1943, then skidded to 133.9, 106 and 82.6 in the three succeeding years. Employment, man-hours and payrolls also dropped in like fashion. At the same time, unit labor costs jumped from 135.7 in 1945 to 173.5.

In iron mining, production reached a peak index of 202.7 in 1942, then fell steadily to 194.5, 180.8, 169.8 and, in 1946, 136.7. Workers, man-hours, payrolls, output per worker and per man-hour also dropped. Unit labor costs, on the other hand, rose from 125.1 in 1945 to 148.9.

Output per man-hour in primary smelting of copper, zinc and lead was one percent less during 1946 than it was during 1945.

Bureau of Mines Studies Effect of Premium Losses

Copper production in the United States fell seven percent in October, almost entirely because of a strike at the Utah mine of Kennecott Copper Corporation, according to the Bureau of Mines. [The strike ended early in November—Ed.] Mine output in October was estimated at 65,745 tons, against 70,470 tons in September and 72,100 tons in August.

An effort to gage the effects of the expiration of the Premium Price Plan has been made by the Bureau. Various factors, of course, tend to complicate determinations as to the causes of mine closings. Sometimes a combination of factors is responsible; and in some instances mines that require premiums for long-term operation have remained in production until an already developed stope was exhausted, or in the hope that an early reinstatement of premium payments in some form would make a costly shutdown unnecessary. The study indicates that 16 mines that produced some copper had closed by the last of October because of the end of premium payments. Copper production in these mines averaged 540 tons monthly in 1946, and 700 tons in 1947.

Lead production from United States mines increased seven percent in October and was the largest monthly output since April 1947. The average daily production rate was 39 short tons (four percent) greater in October than in September. Output in the Eastern States remained virtually unchanged from September, whereas lead production in the Central and Western states gained 13% and four percent, respectively.

According to the information obtained, 51 mines that produced some lead had closed directly or indirectly because of the expiration of subsidy payments. Lead production from these mines averaged 560 short tons monthly in 1946 and 600 tons in 1947. Most of these mines produced zinc in addition to lead and the termination of subsidy payments on zinc output was, for the most part, the determining factor in closing.

The average daily rate of zinc production from domestic mines in October rose four percent, continuing the general advance in output since July 1947. October zinc production, in terms of recoverable metal, was 50,643 short tons, an average of 1.634 tons per day compared with 47,126 tons in September produced at an average rate of 1,571 tons per day. The average daily

mining industry to be essential to sound domestic economy and national defense. It advocated a realistic labor policy, with training of new underground miners, urged encouragement of exploration and development of marginal and low grade properties. It favored adequate appropriations to continue the activities of the U. S. Geological Survey and the Bureau of Mines. It opposed granting new powers to the Government over mineral lands not valuable for fissionable materials and advocated the ownership by coastal states of submerged lands and their mineral resources. It opposed attempts to force resoiling of dredged lands, and also control over water pollution by a federal agency. It urged restoration of certain mineral lands in the United States and Alaska to the public domain.

Two Zinc Retort Smelters Are Being Closed Down

The Hegeler Zinc Co. of Danville, Ill., has announced the abandonment of operations at its 55-tons-per-day retort smelter. Reason for the shutdown was stated to be the high cost of zinc concentrates. The company will continue its zinc rolling operations.

American Metal Co. is closing down its zinc smelter at Langeloth, Pa. Capacity of this plant is 122 tons per day.

Canada Revises Plan to Subsidize Gold Industry

Canada's proposed "cost-aid" program for its gold industry (E&MJ, Dec. p.109) has been revised because of objections raised by the International Monetary Fund, Finance Minister Douglas Abbott announced last month. The original plan also was unsatisfactory so far as gold producers were concerned.

In late November and early December the plan was the subject of meetings between Canadian Government officials and representatives of Canadian gold mining operations. The latter group pointed out that the plan involved discrimination against going operations, in effect penalizing those operators who, against serious odds, had managed to keep up production and employment. The operators contended that the plan would not increase production, as many of the 21 mines now operating at a loss would close down if it should become evident they were not going to obtain help. This loss in production, according to the operators, would outweigh any increases resulting from the plan. They urged a flat subsidy to all producers alike, stating that a return of $52 per ounce would be necessary to offset the handicaps of postwar inflation.

Under the amended plan, the Canadian Government will pay one-half of the amount by which a mine's cost of production exceeds $18 an ounce. This payment will be made only on gold produced in excess of two-thirds of a mine's output in the year ended June 30, 1947.

Assistance is to be given to Canadian gold producers for a period of three years, and will apply to production beginning Dec., 1947. With reference to new mines, subsidy payments will apply on total output in the first year and on production in excess of two-thirds in the two succeeding years.

The United States Treasury, as well as the International Fund, had made known its distaste for Canada's proposed gold subsidy. The Treasury's position was that the plan, by furnishing added purchasing power without producing consumer goods, was inflationary. Also, the Treasury was obviously fearful that the plan would encourage currency devaluation and premium prices for gold in other countries. Such programs the Treasury is bent upon discouraging, apparently being determined to fulfill the objectives of the International Fund.

Canada's latest plan is an interesting reaction to these outside pressures. Although it apparently answers certain technicalities in not giving color to a price of gold exceeding $35 per oz., it will actually help gold production more than the original plan, as it will lend assistance to virtually all producers. The original plan only helped new production.

Commenting on Canada's revised plan, Secretary of the Treasury Snyder said, "The United States would view with disfavor any tendency for countries to become dependent on subsidized gold production as a solution to the problem of arriving at, and maintaining, equilibrium in their balances of international payments."

Old Friedensville Zinc District Being Reopened

The Friedensville zinc district, discovered over a hundred years ago and unproductive for half a century, will be reopened by the New Jersey Zinc Co. of Pennsylvania. A 1250-ft. shaft is being sunk and a modern flotation plant will be erected. Plans are to start production in 1951.

The Friedensville district, near Bethlehem, Pa., was the first zinc mining area in the country, having been discovered about 1845. At that time the art of zinc smelting was unknown in this country, mining skill was rare, and little was known about putting zinc to use. As a result operators had a difficult time.

It was in this area that Mathiessen and Hegeler, bringing Belgian knowledge of zinc reduction to this country, performed some of their earlier tests that subsequently led to their building a zinc smelter at LaSalle, Ill., in the sixties.

The old Friedensville operations lasted from 1856 to 1892. One of the interesting installations was a large Cornish pump, said to be the largest of its kind, and christened "the President" in honor of President Grant.

The properties were acquired by the New Jersey Zinc Co., of Pennsylvania in 1899. Since that time several drilling campaigns have been conducted, the last ending in 1945.

Trona Deposit Is Being Developed in Wyoming

The production of trona on a large scale is anticipated for western Wyoming, according to a report received from the town of Green River.

The presence of trona in Wyoming has been known for many years, though its production has not been undertaken on a large scale before this venture. The Westvaco Chlorine Products Co. reports the discovery of a large seam of trona at a depth of 1,500 ft. A shaft is being sunk at this spot, west of Green River, by the Morrison-Knudsen Construction Co., at a cost of about one-half million dollars. A pilot plant will also be built.

ICC Awards Rails 10% Hike But Limits Ores & Metals

The Interstate Commerce Commission increased freight rates 20% today until June 30, 1948, for railroads, water carriers and freight forwarders.

The new increase supersedes the 10% increase granted to those carriers in October, also on a temporary basis. Meanwhile, hearings have been held in various sections of the country on a petition of the railroads for increases of 41% in the Northeast and between that section and other sections of the country, and of 31% in and between the other sections.

Certain commodities will not take the full 20% increase. The basic line-haul rates on iron ore, aluminum ore and concentrates, lead ore and concentrates, and zinc ore and concentrates, will be increased 20c. a ton, net or gross, for the temporary period, but no increases are to be made in the rates on iron ore to, or handling charges at, the upper lake ports. On metallic aluminum, copper, lead and zinc the maximum increase is fixed at 11c. per 100 lb.

The basic line-haul rates on coal and coke, including lignite, may be increased 20c. a net ton, or 22c. a gross ton, with a single increase applied to the rail rates where there is an intervening movement by water. The iron ore and coal and coke increases are double those granted in October.

Colorado Mining Ass'n Will Meet in February

The Colorado Mining Association has announced that its annual meeting will be held in Denver, Feb. 5, 6 and 7, 1948. Program chairman is Harold Worcester, president, Telluride Mines, Inc. Roy Wicker of Denver is vice-chairman.

NEWS OF THE INDUSTRY

Northwest Mining Association Is Optimistic Over Future Developments: Endorses Technical Progress

More efficient mining was the keynote at Northwest Mining Association's 53rd convention held in Spokane, Dec. 5 and 6, in collaboration with the Columbia Section, AIME and the Mining Bureau, Spokane Chamber of Commerce. The program carried out the idea that high wages, increased operating costs, and limited availability of competent labor can be counteracted by planned work programs, new technical processes, and increased mechanization. Six hundred fifty persons, representing 14 states, British Columbia and Alaska attended the meetings, perhaps the largest convention in the history of the Association. After a welcome from the president, Wray D. Farmin, who had as his co-chairman for the opening session James L. Leonard, past president, the morning was given over to 1947 mining development in the Western states and British Columbia.

The only depressing pictures came from the state of Oregon, where F. W. Libbey, Portland, director of the State Department of Geology and Mineral Industries, summed up conditions by saying, "Metal mining in Oregon is sick," and from Utah, where A. G. MacKenzie, Salt Lake, vice-president of Utah Mining Association, gave the termination of premium price payments as the leading cause for lowered metal production in that State in 1947. A bright picture for metallic production in the State of Washington was given by Stephen Green, Olympia, Division of Mines and Geology, who reported 31 properties and 42 others being developed. Harry Ingalls, editor of the *Wallace Miner*, described work in the Coeur d'Alenes, the large dividends paid, and predicted that the district has merely started on its career as a mineral producer. Anaconda Copper Company's announced plans for expending $20,000,000 during the next five years for mining and milling low-grade copper was the highlight in the 1947 Montana report, made by Carl J. Trauerman, Butte, secretary of the Mining Association of Montana. He said this would lengthen the operations of the company from 40 to 60 years and refuted economists statements of "have nots" in mining. Frank E. Woodside, Vancouver, B. C., manager of British Columbia, and Yukon Chamber of Mines, gave an optimistic picture of Canada's mining industry. "Well trained prospectors and well financed syndicates and companies prepared to risk their capital in prospecting ventures are necessary," Mr. Woodside said. Among contributions to the rehabilitation of Canada's gold mining industry are the announced plan to subsidize new gold production and the admission to the country of dragline dredges with a 2 cu. yd. bucket capacity or more, duty free.

The importance of non-metallic mineral was stressed as never before at these conventions. C. A. Sargent, manager, Northwest Magnesite Co., at Chewelah, Wash., co-chairman with Robert G. Vervaeke, manager of U.S. Gypsum, Evans, Wash., at the session where phosphates were emphasized, said that the Northwest has in its phosphate deposits a natural resource which is equally important to the hydro-electric power generated by Grand Coulee dam and other dams on the Columbia River and its tributaries. Richness of Washington in industrial minerals was stressed by Sheldon L. Glover, Olympia, supervisor of the State Division of Mines and Geology. Among the many minerals enumerated, he spoke of Stevens County's magnesite deposit as being second in value of production in the United States, if not first. With imagination and capital, profitable businesses may be built on non-metallic resources, he said. Three recent discoveries made by his department are now being evaluated. Harry Marsh, secretary of Idaho Mining Association, described Idaho's phosphates, and Richard Anderson, managing engineer, Portland, told how surveys are made. The brightest picture for industry came with the recommendation of Roscoe E. Bell, Boise, coordinator, western phosphate program for the Department of Interior, that seven large factories be established immediately to make phosphorus and phosphate fertilizers, with an investment of about $35,000,000. He said the West has about 60% of the nation's phosphate deposits, with huge deposits in southern Idaho.

Charles E. Schwab, engineer of the Bunker Hill & Sullivan Mining and Concentrating Co., at Friday's luncheon meeting opposed plans to shackle the zinc-lead industry with more regimentation. He averred that block caving may be an answer to economists who believe the U. S. is a "have-not nation", and gave an enthusiastic, detailed report of plans of his company for the next six months in preparing for production from the first block of 300,000 tons.

The adoption by the mining industry of new methods and new machines to obtain ore from the ground as quickly and cheaply as possible was stressed at the Saturday morning session where P. E. Oscarson, mining geologist, and C. A. R. Lambly, general superintendent of Pend Oreille Mines & Metals Co., acted as co-chairman. R. S. Hooper, assistant mine superintendent of the Bunker Hill mine, reported on methods and machines used by his company to speed up and facilitate operations, while Frank Taft, mine superintendent for Goldfield Consolidated Mines Co., told of the wider use of diamond drill long-hole blasting. An extremely compact, easily assembled and dismantled prefabricated heavy-media plant, the first of its kind, was described by H. A. Meyers, manager, Spokane branch of Western Machinery Co. Semigelatins and high grade ammonia dynamites were described as the recent developments in explosives by Roy Larson, technical advisor, explosive division of the du Pont company.

At a luncheon meeting Dr. Francis Thomson, president of the Montana School of Mines at Butte, spoke of the mining outlook of the Pacific Northwest while Mrs. Viola McMillan, president of the Prospectors and Developers Association, Toronto, Ontario, spoke of Canada's mining. Dr. Thomson voiced the opinion that we have been ultra conservative in our geophysical methods program, and felt we could look to the oil industry for guidance in developing methods. He also took part in an innovation of the mining convention's program that afternoon when a panel of educators appeared from Western mining schools to tell the assembly what was being done at the various institutions to improve the standards of their graduates. Dr. Thomson felt a good faculty could do more to improve products than either a good curriculum or a good plant. Others taking part were Drury Pifer, University of Washington, Seattle; Donald Mason, Washington State College, at Pullman; Dean A. W. Fahrenwald, University of Idaho, Moscow; and Father C. A. Carroll, Gonzaga University, Spokane.

The association, through its resolution committee, headed by J. J. Curzon, chairman, returned to its attack on the currency system and opposed lending large amounts of money to foreign nations until "sound currency systems based upon gold and silver" are adopted by the world. At the same time it hit valley authorities and demanded instead orderly development of the country's waterways under the direction of Army Engineers and the Bureau of Reclamation. It called for relaxation of bureaucratic controls over the mining industry, endorsing free, private, competitive enterprise. It declared a strong and prosperous

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JAN 22 1948

SUPPLEMENT

To January, 1948 issue

ENGINEERING AND MINING JOURNAL

Because of production difficulties, this section of the January E. & M. J. was omitted from the issue already mailed to subscribers

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"The fate of the world sits on this rug"

– JOHN L. LEWIS

NOTE: Paste this editorial in your hat. Re-read it as you start to shiver the next time John L. Lewis cuts off the nation's coal supply.

"Labor monopoly" will mean much more to you then. But if you are worried enough you will get after your Congressman to do his part now — before the shivering starts.

★ ★ ★

"The fate of the world sits on this rug."

The men on the rug: John L. Lewis, President of the United Mine Workers, who made the remark; Benjamin Fairless, President, United States Steel Corporation; George M. Humphrey, Chairman, Pittsburgh Consolidation Coal Company; Harry M. Moses, President, H. C. Frick Coke Company; Charles O'Neill, President, United Eastern Coal Sales Corporation; the late John O'Leary, International Vice President of the United Mine Workers; and John Owens, President, District No. 6 United Mine Workers.

The place: Room 800, Carlton Hotel, Washington, D. C.

The time: Last July during the "negotiation" of a new soft coal contract.

The outcome: Another whopping increase in wages and the price of coal, another hike in the cost of living, and a "contract" which binds the United Mine Workers only as long as they are "willing and able to work."

Mr. Lewis was right. The fate of the world did sit on the rug. In fact, it sat at Mr. Lewis' feet, for, as this editorial will explain and as the outcome shows, his power over coal is absolute.

Without coal modern industrial civilization collapses. Without Mr. Lewis' assent coal can not be mined. He has the nation and, in the years 1947-48, the world at his mercy.

The Taft-Hartley Act, good as it is, does nothing to check this kind of monopoly.

I

The Taft-Hartley Act fails to protect the public in many major particulars.

Here are some of them.

1. Labor monopoly is promoted and protected by its continued exemption from the federal antitrust laws. Management has no such exemption and should not have.

2. Industry-wide bargaining, a kind of second-degree monopoly, is left virtually undisturbed. So is union-wide bargaining which extends the power of national unions far beyond a single industry.

3. Featherbedding, the art of getting paid for doing nothing, is left largely intact.

4. The menace of having local utility strikes wreck the health and safety of a community is left untouched. Postponement and persuasion are the only instruments provided to deal with strikes that would wreck the nation.

My purpose in citing these omissions from the Taft-Hartley Act is not to belittle the act or its framers. They did a most courageous and constructive job. They made a real start toward restoring a workable balance in industrial relations in the United States, so far as the law can do it. But they have not completed the job. Among their omissions the two discussed in the next sections of this editorial stand out above all others.

II

The most serious Taft-Hartley shortcoming is its failure to deal with labor monopoly.

Labor monopoly exists wherever a union is so strong that bargaining becomes a sham and the union virtually dictates its own terms.

If an employer or group of employers secures a monopoly or anything approaching a monopoly, prosecution for violation of the federal antitrust laws

is in order. That is as it should be, for monopoly means death to economic and political freedom.

But if a labor union secures complete monopoly control over an industry through control of its workers, that union remains above and beyond the antitrust laws. "The fate of the world sits on this rug." By that imperial attitude John L. Lewis fully demonstrated how obsolete is the notion that labor unions are weak and, therefore, need exemption from the antitrust laws. Through the United Mine Workers, Mr. Lewis controls about 90% of the coal miners. (No company controls more than 5% of the nation's coal output.) Wherever he sits he has at his feet the welfare of the whole nation.

Great international unions exercise a comparable measure of monopoly control in other basic industries — steel, transportation, and automobiles, for example.

These labor monopolies can destroy the nation if they are not themselves broken up. Witness the plight of France. There the Communists have found in the great labor monopolies an instrument for shaking the nation to its foundations.

III

The Taft-Hartley Act also leaves untouched industry-wide collective bargaining, which is a kind of second-degree monopoly.

When all or almost all of the employers in an industry get together with the union leaders to agree on wages and working conditions (that is called industry-wide bargaining) they set up a monopoly control. It is a less concentrated monopoly than when the terms are dictated by either side, as Lewis dictates them in coal. But, nonetheless, competition is eliminated and monopoly control is established over wages, which are by far the largest element in the cost of production. It follows that public regulation of collective bargaining — *which means the end of free unions and free management* — is not far behind.

Some employers defend industry-wide bargaining as their only defense against industry-wide unions. Other employers like it because it makes wages and hours uniform for their whole industry.

For those employers who are forced into industry-wide bargaining in self-defense the road to relief is clear. Congress owes it to them and to the public to free them from the necessity of dealing with a monopolistic union. The best way to do that is to remove the exemption of labor unions from the federal antitrust laws.

To those employers who engage in industry-wide bargaining because they like it the proper answer is also quite clear. They (and the union involved) are maintaining a private monopoly which is offensive to the public interest. It should be prevented by law.

IV

Congress should finish the job of eliminating labor monopoly and industry-wide bargaining.

In the course of enacting the Taft-Hartley law last spring the House acted to eliminate the exemption of unions from the federal antitrust laws and to make industry-wide bargaining illegal. The Senate, however, refused to go along.

The principal reason advanced in the Senate for deferring action was that more knowledge is required to legislate intelligently. To get the needed information, a joint Congressional committee was created.

It is standard Congressional practice to stall off tackling a difficult job by creating a special committee to study it. The new joint committee is not likely to prove an exception to this rule — *unless the voters loudly demand of Congress that it get on with its job of protecting the public interest in the conduct of labor relations — a job which is nowhere near done.*

Helpful and effective as many of its provisions are, the Taft-Hartley Act does not face squarely the central principle of industrial relations in a free society. That principle is this: *Neither employers nor organized workers, separately or in combination, shall exploit the public by establishing a monopoly.*

Do not let your Congressmen go to sleep on the job of solving that problem or hide from it because of fear. The perfect solution may be hard to find. But the problem can be largely solved by making organized labor subject to the federal antitrust laws just as management is now subject to them. If that problem goes by default your children and your grandchildren will really know what slave labor means.

President, McGraw-Hill Publishing Company, Inc.

1949 — Can Be a Good Year Too

You can expect good business to run on well through 1948.

But old-time competition is close upon us.

And 1949 will be a critical year for all of us – making lower taxation imperative NOW.

These are the main conclusions drawn from a nation-wide survey of industry's plans for new plants and equipment which McGraw-Hill has just completed. Here are the major findings:

1. Capital expenditures in 1948 may be a little lower — but at the most only 8% lower – than in 1947.
2. In 1949 capital expenditures may decline. 1949 plans are still fluid. However, those which have been projected now show a falling off. (Washington planners, please note: Current official attempts to discourage capital expansion may turn out to be superfluous – or downright dangerous.)
3. Industry's initial postwar rebuilding will be 85% complete at the end of 1948. When this first wave of deferred maintenance and expansion is finished, American industry will have more than half again the capacity it had in 1939. This does not mean the end of needed capital expenditures. Business will need to invest much more. (President Truman sets an investment goal immediately ahead of $50 billion.) But it does mean that tough competition is returning fast.

• IF YOU WANT *full details of the McGraw-Hill survey of Capital Expenditures, which is summarized in this editorial, write to the Economics Department, McGraw-Hill Publishing Company, 330 West 42nd Street, New York 18, N.Y.*

These are solid facts, based on plans which are firmly made by a broad cross-section of American industry and which the McGraw-Hill survey revealed.

The greatest contribution of this survey is the information it supplies on business plans for the purchase of new plants and equipment. What business planned to do about such expenditures was by far the biggest unknown element in the 1948 outlook. For, if business planned to slash its outlays for plants and equipment this year, that fact alone could bring a sharp downturn in business.

In making this survey, McGraw-Hill researchers all over the nation personally interviewed top executives of companies selected to make up a scientific cross-section of industry. Each executive was asked to give, *not his opinion* about general business trends, but *factual details* about his company's plans for 1948. By adding together the plans of the companies interviewed, McGraw-Hill has secured, for the first time, a reliable picture of what business plans to do in the months ahead.

Here are plans for 1948 and 1949, as revealed by the survey:

1. Industry still needs more than a year to finish its initial postwar maintenance and rehabilitation program.

Among manufacturing industries, top executives report that 64% of their program for the immediate postwar period is now complete. According to present plans, 85% will be installed by the end of this year even though some manufacturing industries still have a long way to go. For instance, oil companies will complete only three-quarters of their presently planned expansion program by the end of 1948.

2. Business may spend less on new plants and equipment this year than the record $16.1 billion spent last year. But the decline

probably will be negligible and certainly will not be great enough to bring on a business recession.

At the time McGraw-Hill interviewed top executives, some companies had not yet approved their 1948 capital budgets. Under the extreme assumption that those particular companies will make *no* capital expenditures in 1948, industry's 1948 bill for new plants and equipment will run to $14.9 billion, or 8% below last year's record figure. Under the more realistic assumption that those companies will cut their capital investment only as much as the companies which had already drawn up their plans for 1948, industry's 1948 capital budget will run to almost $15.8 billion, a decline of only $300 million from 1947.

Thus the over-all conclusion of the McGraw-Hill survey is that capital expenditures by business will be only slightly lower this year than last.

3. Business executives will not slash their 1948 capital budgets unless they are convinced that a real slump is in the offing—and they are not convinced now.

Almost two-thirds of all manufacturing companies say they would not cut capital budgets sharply even if business activity declined 20%. What is more, even a 15-20% boost in wage rates would have little effect on projected capital budgets. If wages go up, 57% of manufacturing companies would not change their capital budgets, 26% would increase them, and 17% would cut them.

4. Most executives look for an increase in their company's sales this year.

More than half of all manufacturing companies are planning on a sales increase over last year of 10% or more. A third of them say sales will be about the same as in 1947. And fewer than 10% look for lower sales.

5. Manufacturing companies will finance much of their purchases of new plants and equipment in 1948 from funds set aside out of past or current earnings.

Utilities and railroads, on the other hand, must go to the securities markets or commercial banks to finance most capital expenditures.

Although manufacturing companies say they can finance this year's capital expenditures in large part from current profits and past savings, all evidence indicates that, to do so, they will use up most of the funds they earmarked during the war for this purpose. So in 1949, industry must go to the capital markets or to the commercial banks if it is to continue to spend for capital purposes. If the securities markets continue to lie in the doldrums, *as they will under present tax laws,* only companies with triple A credit ratings will be able to raise funds that way.

6. Purchases of new plants and equipment may fall off in 1949.

The McGraw-Hill survey collected all available evidence on plans for 1949 capital budgets. Fewer than 40% of all manufacturing companies now have definite plans for 1949. Of those that have plans, 45% intend to spend less than in 1948, 30% plan to spend the same amount, and a quarter expect to spend more. These preliminary decisions would seem to indicate that capital investment may fall off in 1949.

7. Industry's production capacity in 1949 will be far above prewar.

Manufacturing capacity will be more than 50% greater than in 1939 once the present wave of postwar building is complete. Almost a third of all manufacturing companies report that their capacity will be double or more than double the prewar figure. Thus, 1949 may see a huge increase in production of many things that now are hard to buy.

The last two points in this summary mean that 1949 will be a critical year. We must forestall a sudden drying up of capital expenditures in that year. We must be able also to absorb a great outpouring of production both of capital and consumer goods.

What will happen to business in 1949, therefore, will depend on how successful we are this year in dealing with such momentous problems as taxation, foreign aid and prices. But 1949 *can* be a good year too.

The next editorial in this series will discuss the pivotal problem of taxes.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 65TH OF A SERIES

Why You Cannot Get Ahead As Your Father Did —

THE UNITED STATES is being forced toward socialism by a tax revolution of far-reaching consequences.

We have not yet felt fully the deadly impact of this revolution because inflation and the postwar boom have delayed its effects.

But from now on, more and more people will feel its bite. Already it is the dominant element in our economic life. Already it is the major factor in our chances of keeping our jobs and of getting ahead.

Here are some pertinent facts on this tax revolution:

1. The tax load that our nation can safely carry has long since passed the danger point.

Our capitalistic system is in real danger when taxes take more than 20 percent of our national income (or 20¢ out of every income dollar). Beyond that point there are not sufficient dollars left in private hands for capitalistic America to raise the capital required to keep its industry going. So we are right now being nudged further and further into socialism.

For today taxes take *twenty-five* percent of national income (or 25¢ out of every income dollar).

2. The tax revolution has undercut the incentives that help us to get ahead.

The group whose incomes range from $5000 up now turns over about one-half of its *total* income to federal, state, and local tax collectors. Before the war, this group gave the tax collectors one-third of its collective income.

In sharp contrast, the group of people with incomes under $5000 pays the tax collectors 20% of its income for direct and hidden (mostly hidden) taxes — against 18% before the war. This lower-bracket group needs immediate tax relief but I believe most sincerely that persons earning less than $5,000 have a very vital reason for also supporting tax relief in the much more heavily hit upper brackets.

As you get ahead, you expect your taxes to go up. Taxes should be levied, in principle, according to ability to pay. But today tax rates rise so sharply that they virtually destroy all incentives to get ahead, to save, and to invest in new and untried enterprises that open up new jobs. *The progressive tax idea now carried to punitive extremes has become a destructive tax revolution.*

Today the U.S., envied by all the world for the wealth it has won under capitalistic incentives, has cut its incentives below those offered by that state whose police methods strike terror into the hearts of all workers.

Soviet Russia rewards successful managers, writers, and scientists better relatively than we do under our present tax system.

A revolution that sweeps away incentives will quickly sweep away our free enterprise economy. The only substitute ever found for free incentives is the whip-and-lash compulsion of the police state. And no police state has ever been able to match the production of a free people with a free economy that gives adequate rewards to individual producers.

3. The tax revolution hits squarely the average American's chances of keeping a job and of getting ahead.

If you make less than $5000 a year you may well ask why you should worry about a tax revolution that seems directed at the comparatively small group, about 10% of American families, who make $5000 a year or more.

The answer, it seems to me, is that "risk capital," the money that makes new jobs when invested in growing companies or in new businesses, must come largely from the people making more than $5000 a year. The others usually cannot afford to take any risks with their savings.

It was the savings of this 10% group that made possible the huge growth in American industry and American jobs and our progress in raising American living standards in the years before 1930.

Now the government is taking so much from the 10% group in taxes that they cannot afford to risk any savings they manage to accumulate. Most of their savings now go to insurance companies and savings banks which are barred by law from making risky investments or investments even in seasoned common stocks.

The flow of risk-capital from this 10% group can only be renewed by reducing their taxes. The result will benefit everyone over the difficult years to come by providing more and steadier employment for all.

The cost of the presently proposed reduction, *less than 1% of the national income,* can well come out of current revenue surplus. It will be repaid many-fold by the new enterprises it will stimulate.

4. Jobs will be lost if risk-capital does not increase.

Unless the flow of risk-capital into business *can be doubled* and *trebled* in the next few years, business investment in job-making new plants and equipment will drop sharply. The McGraw-Hill survey of prospective capital expenditures, reported in the previous editorial in this series, made that quite clear.

When such a drop in business investment has come in the past, it has brought with it a general slump in business — and unemployment.

As we work through the enormous demand for goods of all kinds built up during the war years, and as the war-accumulated savings of businesses and individuals are spent, it will be harder and harder to keep production and employment at today's high levels.

Then—at the very time that we shall need all our drive to maintain prosperity—we shall be hit by the full impact of the tax revolution.

5. Compounding these troubles is a tax system as out-of-date as an oxcart.

Twenty years ago, when taxes took only twelve cents out of the national income dollar, our rattle-trap tax system was little more than a nuisance. Today, when it takes twice as big a bite, its double-taxing of the earnings of investors, its discriminatory excises, and the overlapping of federal, state, and local levies are a fatal handicap. A new system, a fair system, a rewarding system, is a necessity if American initiative and enterprise are to have a fair chance.

What Congress does now about federal taxes will bear crucially on our ability to sustain prosperity.

By demanding economy in government and by re-designing the tax system to stimulate initiative and risk-taking, Congress can multiply many times our chances of maintaining full employment and of raising living standards.

By allowing people to save more and by renewing the incentive to risk capital in new enterprises, Congress can actually insure a bigger tax return in the years ahead. More business will result — and pay more taxes.

That is the only way that a free people with a free economy can carry the tax load.

That is the best way that our government can improve our chances of keeping our jobs and of getting ahead. I suggest that you discuss these vital matters with your chosen representatives in Congress, in your state government, in your local community.

President, McGraw-Hill Publishing Company, Inc.

Only a Prosperous America Can Be Free

DURING May 50 million American workers will get from the Congress of the United States a real incentive to work.

This incentive is called a tax cut. Beginning May 1, the withholding tax on incomes will be reduced, giving everyone a much-needed increase in take-home pay.

But the tax cut will have a far more important effect. It may be literally a life-saver for American employment and production—and, hence, for the stability of the world. It will help to do two things which must be done if our economy is to continue to furnish good jobs and good earnings.

1. *It will generate part of the private funds for investment in common stocks—the "risk capital" which we need to sustain prosperity.*

2. *It will provide part of the incentives necessary to make American business management still more effective.*

These two predictions are not advanced as matters of opinion. They are based on facts reported by McGraw-Hill field editors.

These facts show why the reductions in upper bracket income tax rates are most significant for our continued prosperity. For the first time in more than twenty years the tax burden on people who can afford to risk their savings has been lightened. To find out what this will mean to the economy, McGraw-Hill field editors all over the nation asked a group of business executives making $15,000 a year or more how they will use the money which the tax cut gives them. Here is what they said:

1. They plan to save—not spend—three-fourths of the money they keep as a result of tax reduction.

2. They plan to invest one-half of these savings in common stocks. If all persons making over $15,000 follow this pattern, they will make available about a half billion dollars of risk capital for American industry.

WHAT THE TAX CUT WILL DO

What will upper bracket taxpayers do with their tax savings?
What can business expect as a result?

TO ANSWER THESE QUESTIONS, McGraw-Hill field editors interviewed a carefully selected sample of business executives earning $15,000 a year or more. Here, for the first time, are solid facts that show how tax reduction will effect the supply of risk capital and business incentives. These are the results:

1) How much of your tax reduction will you save? **74%**

2) How much of your tax savings will you invest in common stocks? **52%**

3) Will lower taxes lead you to switch some of your investment in bonds to stocks? **Yes 28%**

4) Have you passed up an opportunity to invest in a new business in the last five years because the return after taxes did not justify the risk? **Yes 40%**

5) Will lower taxes make you more inclined to take a risk on a new business? **Yes 80%**

6) Have you turned down the opportunity to take a bigger job in the last five years because taxes would take too much of the additional income offered? **Yes 13%**

7) Do you know of actual cases of executives who have turned down bigger jobs or more work because of taxes? **Yes 38%**

8) Will lower taxes make you more inclined to take on a bigger job or more work? **Yes 59%**

3. They also will switch some of their present savings from bonds and bank accounts to common stocks. This might easily add a billion dollars or more to the supply of risk capital.

The one-half billion dollars of tax savings and the funds switched from other investments into common stocks is not enough to end the shortage of risk capital. But it is a start.

Before passage of the tax law, risk capital had been growing increasingly scarce.

One measure of the scarcity is that last year only four-tenths of 1% of national income went into new common stocks. In 1925, a year of normal prosperity, almost 3% of national income was invested in new common stocks.

Another measure is that between 1940 and 1947 people actually reduced their holdings of corporate stocks and bonds by nearly a billion dollars. During the same period, people salted away almost $150 billion in such safe havens as cash, bank deposits, and government bonds.

This drought of risk capital hit us just when we need a vastly increased flow of risk capital to finance the expansion and improvement of our American productive machine. We need risk capital to search for new oil fields and to build new pipelines and refineries. We need capital to expand our over-loaded electric and gas utilities. We need it to finish re-equipping our airlines and railroads and bus lines. We need it to modernize our textile production. We need it to keep pace in the magical, booming chemical industries. We need it to launch the new industry of television.

We need capital for all this work and for much more besides. And we must do all this work if we are to keep the United States dynamic and if we are to create new and better jobs.

The tax cut comes just in time. As the last editorial in this series showed, the flow of risk capital must double or triple if we are to avoid a cutback in industrial expansion next year. A major reduction in industrial expansion because of a shortage of risk capital would menace our prosperity. Whenever capital expansion has sagged, the whole economy has sagged. That is the record. That is why every American has a crucial interest in breaking the shortage of risk capital.

The tax reduction now going into effect helps relieve that shortage. In my opinion, we need still other tax changes to assure enough risk capital for healthy industry and healthy employment.

We should encourage the rapid depreciation and replacement of plants and equipment to keep America efficient.

We should eliminate the double taxation of stockholders' incomes.

We should permit full averaging of good years and bad in calculating income tax payments.

We should cut tax rates again as soon as we can.

The tax cut of 1948 will prime the flow of capital. We must keep it flowing.

The tax cut also encourages our successful men and women to work harder and more effectively.

The McGraw-Hill editors collected some solid facts to show how seriously heavy taxes have discouraged business leaders. Here they are:

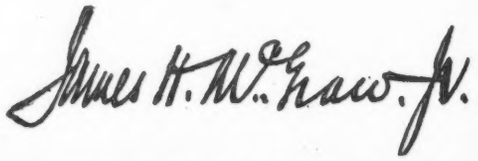
1. One out of seven persons the editors questioned said that they had turned down positions with greater responsibilities because heavy taxes would take most of the greater pay that went with the harder job.

2. Six out of ten executives would be more inclined to accept a more responsible job now that taxes will let them keep more of the added pay such a job would bring.

We all have a stake in incentives which make men work harder, especially talented men. The more we each work, the more we all have.

The tax reductions so far made will leave the government more than enough revenue to meet all its expenses, including the proposed defense expenses, and still reduce the national debt. If more defense money becomes necessary, vigorous economy on less essential government expenses will make possible both stronger military defenses and a better tax system. We need both.

Only a prosperous America can be strong enough to remain free—and to help keep the rest of the world free.



President, McGraw-Hill Publishing Company, Inc.

5,000,000 Youngsters Need Our Help Now

THE bumper wartime crop of babies, about 5,000,000 larger than the population experts expected, is reaching school age.

At school these youngsters should find a good education awaiting them. That is their most cherished American birthright.

But unless something is done quickly, millions of these children will be cheated. They will crowd into classrooms already run on double shifts. They will move in with children who are now sitting two in a single seat. They will read germ-loaded books mangled by a generation of use by grimy hands.

I

So the continuing crisis in American education is given a new twist by unexpected pressure on school plant and equipment.

The U. S. birthrate has jumped by leaps and bounds. Instead of declining in the '40s, as the experts expected it would, the rate climbed from 17.9 per thousand in 1940 to 21.5 in 1943. It jumped to 25.9 in 1947, an increase of 45 percent since 1940. Result—by 1956 elementary school attendance in the United States is expected to jump from 18,200,000 to more than 23,400,000, an increase of about 5,200,000, or more than one-fourth.

The rush has already begun. It will pick up speed next fall.

Now, while this pressure has been building up, our public schools and their equipment have been running down—first through inevitable wartime neglect, then because inflation and material and labor shortages made it difficult to catch up.

If we are to give this bumper crop of youngsters the break they deserve—and reach the educational standards the nation needs—we must speedily do a major job of educational rehabilitation and expansion.

II

Some headway has been made in overcoming the teachers' salary crisis.

Teachers' salaries are improving. Pay problems were driving good teachers away from their posts in droves not long ago. But in the year since the 57th editorial in this series emphasized that crisis, the average teacher's annual salary has increased about $300—from $2250 to $2550.

True, increases vary enormously from state to state and from town to town. In a few states the average increase has been $500; in some less than $100. But, for the nation as a whole, last year's increase put teachers about even in the race with the cost of living. After taxes, their salaries have risen 68%, and the cost of living 67%, since 1939. In terms of pay increases, however, they are not nearly as well off as are industrial workers, whose average weekly wages after taxes have risen 108% since 1939. They are far behind farmers, whose net income is now four times what it was in 1939. And teachers had notoriously low salaries to start with.

A great deal more needs to be done in raising salary standards to put our school system on a firm footing. There are still about 100,000 teachers, nearly 12% of all public school teachers, who hold temporary or emergency credentials. They cannot meet

prevailing standards, and not very severe standards at that, for persons holding their posts.

The salary crisis, however, is easing.

III

But now comes the new crisis in school buildings and equipment.

We would have been hard put to get our schools back into shape after years of wartime neglect—even without a booming birthrate complicating the problem. Right now, 85% of all public school buildings need major remodeling to remove health and safety hazards.

And we aren't building enough new schools to keep up with current needs, to say nothing of catching up on those we were not able to build during the war years. School construction expenditures for 1948 are estimated at $375 million – which is less than what was spent in 1939. With building costs twice as high as they were in 1939, that means we aren't even holding our own—we are falling further behind.

And now comes the rush of war babies.

IV

We must spend at least $11 billion on new schools and equipment in the next decade.

Public and elementary schools must have $6.6 billion. Equally important, another $4.4 billion must be invested in buildings and equipment in our private schools, colleges and universities if they are to meet the demands which will be made upon them. The private school and the privately endowed university are doing their full share and doing it well. The need for them is increasing.

These figures cover only rockbottom needs for educational plant and equipment. But statistics are a very restricted recorder of this crisis.

You can see it better, I'm sure, in schools not very far from your home. There are schools with leaking roofs and outdoor toilets in our greatest cities. There are schools where students still use histories and geographies copyrighted before 1920—books with no mention of World War I, the depression of the 1930's, the Russian Revolution or the rise of the dictators. There are countless schools where modern methods of visual education are completely unknown.

All of these conditions promise to get worse – promptly – as that scheduled 5 million increase in the school population gets rolling.

V

The Metropolitan Life Insurance Company does not indulge in lurid prose. It says after painstaking study of the educational crisis that:

"Unless definite measures are taken immediately . . . large numbers of American boys and girls will be deprived of an adequate education."

Currently we are deeply concerned about our military defenses. We are taking, and I think rightly, emergency measures to strengthen them. But we must regard our schools as a part of our national defense as vital as are our armed forces. This is particularly true in these times of fifth columns and ideological warfare.

If we are wise, we will raise our sights. We will give the continuing crisis in education the same urgent attention being given the more obvious but no more real crisis in national defense.

Go to the school house in your neighborhood and discover what needs to be done to provide for the rising tide of young Americans. Ask your school board and your school administrators and teachers how you can help them.

That is good citizenship.

That is patriotism.

That is our duty to the oncoming generation.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 68TH OF THE SERIES

"Give us the tools..."

TO SURVIVE

America Must Have Better Tools

IN THE past twenty years the United States has failed to provide its workers with enough new tools and equipment.

To most Americans this statement will come as a shock—or will be doubted. We are quite complacent about our industrial equipment, for easily understood reasons.

Throughout the '30s we heard continuously the propaganda line that the United States had become a "mature economy." The job of equipping America with industrial plants and tools was said to be largely done.

Now, knowing that industry is spending billions to expand and rebuild its plants, many people assume that the result must be a first-class industrial system.

A further powerful inducement to complacency is the vastly *worse* industrial condition of most of the rest of the world. When Americans look abroad in almost any direction they see shattered plants and equipment. A natural reaction is that we are sitting pretty.

That is a dangerous reaction. Between depression and war, we have failed to build the tools and equipment we need. This condition is dangerous for three reasons:

1. *From bitter experience we know that national security depends first and foremost on the capacity and readiness of our industrial equipment.*

All of our plans for stabilizing prosperity assume a world at peace. The greatest menace to peace would be an unarmed America, unable or unwilling to keep herself strong and ready for defense—strong in spirit, in resources and in the all-important industrial plant and equipment.

2. *Whether Americans live well—or badly—depends directly on the kind and quality of tools used by American workmen.*

This is true for all workers, and for every worker—from a garage mechanic and his wrenches to a steel mill gang and its rolling equipment. In a monumental study of "America's Needs and Resources" the Twentieth Century Fund found this fact: The improvement in the real income of the American people has more consistently followed the amount of power used in industry than anything else. What the workman worked *with* determined, more than any other factor, the size of his pay envelope, and what it would buy.

3. *Our success in stabilizing prosperity will depend largely on what we do about building new tools and equipment.*

About 30% of our industrial workers are employed in producing tools and equipment. Steady employment for them is essential to our over-all prosperity.

How far have we fallen behind in providing new plants and equipment?

Estimates vary. Here is one rough estimate: If we had built new industrial facilities during 1930-48 at the rate we did in the prosperous '20s, we would have spent at least $100 billion more than actually we did.

To get a better and more complete measure of this deficit, McGraw-Hill is undertaking a survey of American Business' Needs for New Plant and Equipment.

Businessmen all over the nation are being asked to answer questions like this: How much

money would you need to put your plant in first class condition? How much are you planning to spend for new plant and equipment? Where do you expect to raise the money? The results will be reported later in this editorial series. Already the survey shows we have fallen many billions of dollars behind.

Some shortcomings are apparent to everyone. They are revealed in a lot of rickety transportation facilities and in rundown buildings.

Many other deficiencies do not come into general view. They are, for example, the antiquated machines in our plants. Of the privately-owned machine tools in use in 1945—when the last census of metalworking equipment was made by AMERICAN MACHINIST—54% were more than 10 years old. Their average age is higher today.

It is true that in recent years we have hit new highs in total national production. But we have done so by putting far more people to work than ever worked before . . . and by driving equipment to the limit of its waning endurance, sometimes beyond. It has not been done *primarily* in what is by all odds the best way to increase production—to use more and better and more modern tools and equipment.

Haven't we overcome much of this twenty-year deficit by rushing to build new plants since the end of the war?

No. For two clear-cut reasons:

1. The accumulated shortage is tremendous. The total of about $40 billion, which has been spent for industrial plant and equipment since VJ-Day, has not wiped it out.

2. Some key industries have had difficulty in getting the facilities they need. Take steel, for example—the industry that turns out our most basic industrial material. Its needs for new equipment are measured in billions of dollars. To pay for that equipment, it should have *risk capital*—money which people are willing to invest with a risk of losing for the sake of gain. For steel is an up-and-down industry. Earnings on its common stocks inevitably share both ways in those ups-and-downs.

Since the war, steel, in common with most of industry, has been unable to market new common stock successfully. Its outstanding stock is now selling for only about one-half the current net worth of the industry's present assets. With investors willing to pay only 50 cents on the dollar for its facilities, the industry can not readily sell stock to pay for *new* plant and equipment—at higher prices even than the old.

Why can't steel—and other industries—attract people who are willing to risk their money retooling America?

The full answer to that serious question must be left to future editorials in this series, for it involves many things . . . tax reform . . . mobilization of small savings . . . a new respect for corporate profits.

This first editorial seeks simply to emphasize two fundamentals:

First, our standard of living improves with the *quality* of our industrial equipment.

Second, American industry and American workmen badly need billions of dollars worth of better equipment *now*.

The American people must understand that *not only our continued prosperity but also our security as a nation depends upon giving American industry more and better equipment.*

"Give us the tools." This was Winston Churchill's cry for help to win the war. Only if we give American industry new and better tools will we have a chance to win abiding prosperity at home and good order abroad.

President, McGraw-Hill Publishing Company, Inc.

★ THIS EDITORIAL, and a series to follow, will be devoted to a single problem—how to provide American industry with the equipment needed to improve that envy of the world, the American standard of living. No more important problem confronts us today. Upon our wisdom in handling it depends not only the degree of our prosperity, but also our security as a nation.

"Give us the tools . . ."

For High Wages, Full Employment . . . Business Must Have Better Tools *and More Money to Pay for Them*

So far we have escaped the post-war depression predicted by leading government economists. How can we continue to frustrate gloomy prophets who see only depression ahead?

At the end of World War II the federal Director of Reconversion saw depression immediately ahead. He said we would have 6,000,000 unemployed four months after VJ-Day and 8,000,000 a few months later.

But we did not have depression. We did not because:

First, the American business man, sensing the obligations of a vastly more important post-war America, went ahead to build his plant and equipment to meet expanding domestic and world markets—markets bigger actually and potentially, in terms of world-wide trade and profits than any previously envisaged.

Second, the American businessman was able to get the money to go ahead. Since 1945 he has spent $50 billion building new plants and buying new equipment.

There may be other reasons why we missed a depression in 1946. But—make no mistake about it—what has powered our present prosperity is the $50 billion spent by businessmen since VJ-Day to improve their plants.

It provided jobs directly for 5 million people. It paid for more than half of our record-breaking steel output. It put in place the foundations of great new industries such as television. It strengthened the foundations of the chemical, machinery, plastics, steel and oil industries. It has expanded and improved our power systems throughout the country.

This spending has made the difference between prosperity and slump, between industrial strength and serious deterioration.

In fact, we know now that what business spends for new plants and new tools always makes the difference between prosperity and slump, the difference between national strength and weakness.

The accompanying chart tells the story. When we have spent heavily for new plants and equipment, we have had prosperity and strength. When we have not, we have been in trouble.

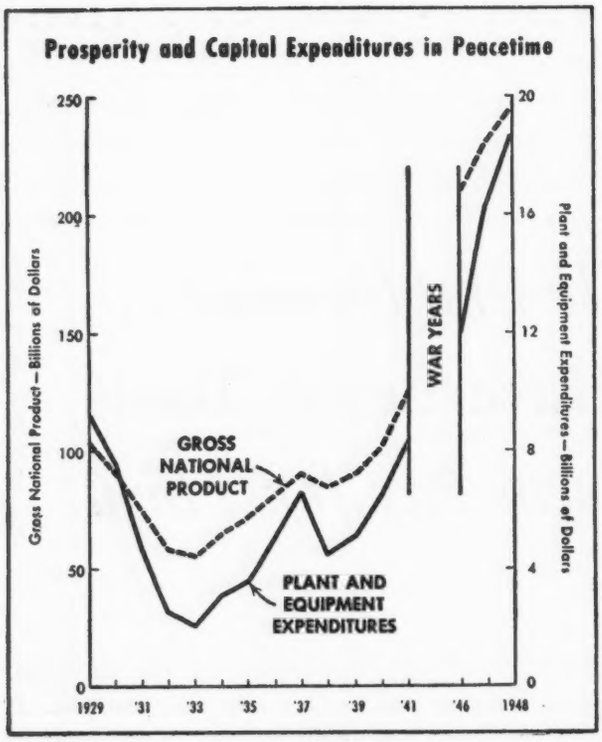
We would have been in trouble since VJ-Day except that business used its war reserves, plus two-thirds of its profits, plus borrowed money to improve and expand its facilities. This year industry is spending $19 billion this way.

Has this great post-war expansion actually made our economy a "mature economy"? Have we come now to the saturation point the New Dealers mistakenly said we had reached in the '30's?

The answer is no!

Proof of that answer is being developed through a McGraw-Hill national survey of "Business' Needs for New Plants and Equip-

continued on next page



ment" details of which will be given in this editorial series in coming months.

We have a bigger nation, more people, to serve right here at home. Further we must meet human needs which the war created around the world. Also, we must sustain a world position such as this country never assumed before.

Here are immediate things crying to be done.

1. Business still needs billions to expand production because our country and our needs are growing rapidly. Example: To meet the demand for power, electric utility companies must nearly double their present generating capacity in 10 years. That will cost more than $7.5 billion. To fill increasing needs for oil and gasoline, oil companies must spend at least as much.

2. Business still needs billions to get its plants up to date and overcome wear and tear. Examples: Over half a million of our freight cars, a third of the total, are more than a quarter of a century old. About two-thirds of the looms in the textile industry are more than 20 years old. Half of our coke ovens, basic equipment for iron and steel production, are more than 20 years old, and only half as efficient as modern ovens.

3. Business still needs many billions to do new things in dramatic new ways. Example: Machinery that will cut out 80% of the dirty, dangerous work of mining soft coal has been perfected. A new automobile engine plant will reduce the work that goes into engine-building by three-quarters.

Hundreds of similar things that our scientists and engineers have developed could be cited. They can be found in every industry. They hold immeasurable promise of adding to the abundance of American living. In fact, there is hardly a step along the whole route of industry—from roughing out raw materials to delivering finished goods—where there are not new and better ways of doing things standing ready for general use.

But the crucial question now is: Where is the money coming from to put to work these new and better ways of doing things?

Business has used its own resources so far... profits and reserves. The stock market, where industry traditionally has raised money from people willing to risk their savings, has been limping along, giving business no chance to get enough money on satisfactory terms. *Business now must look primarily to its own earnings for the money to carry out the improvements which are necessary if America is to keep itself strong and efficient.* The next editorial in this series will deal with this new and crucially-important role of profits.

But business can not count on profits alone to do the job. Profits are too uncertain.

From now on finding the money... to put new ideas and new equipment to work... to go ahead with the expansion and improvement that will thwart depression and build industrial strength *. . . calls for the support of all Americans everywhere.*

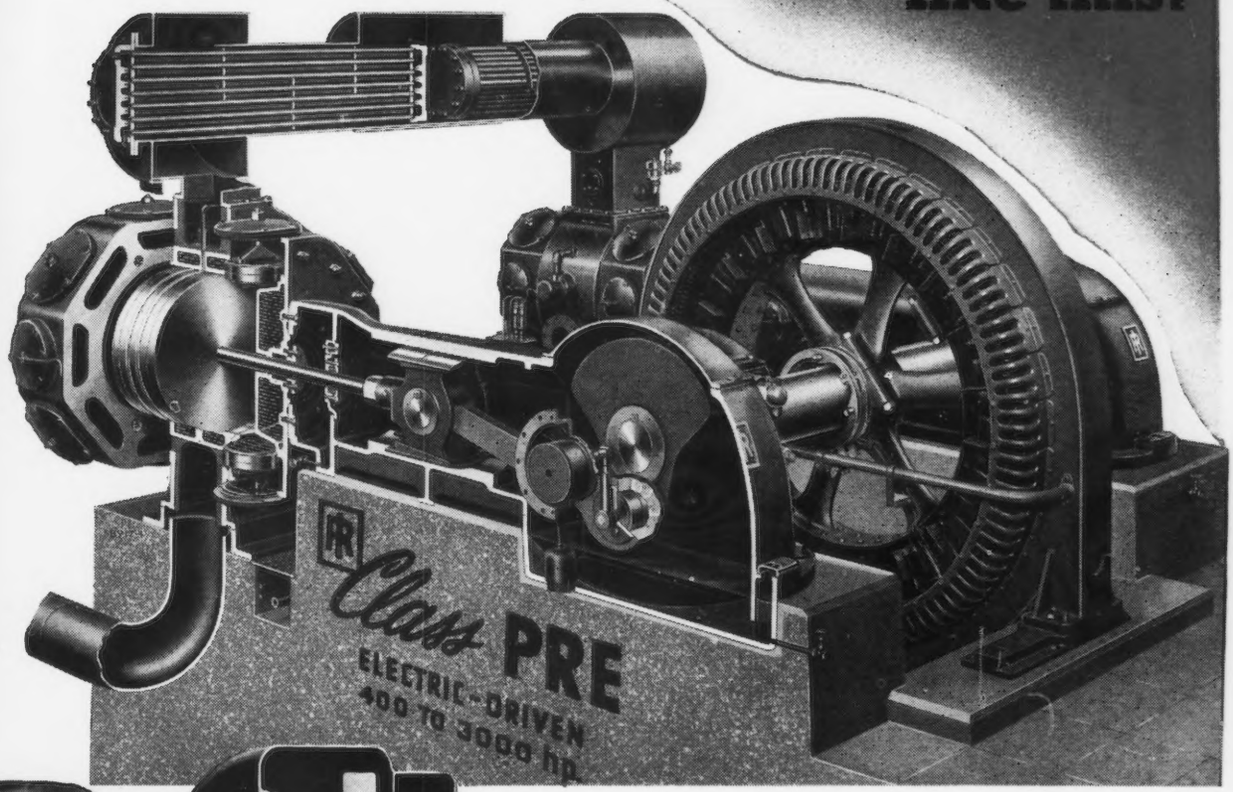
This comes right down to *you... for at stake is your chance for steady work, for better pay, for new things like television, and for more of the every-day things, like coal and clothing, of better quality and at less cost.*

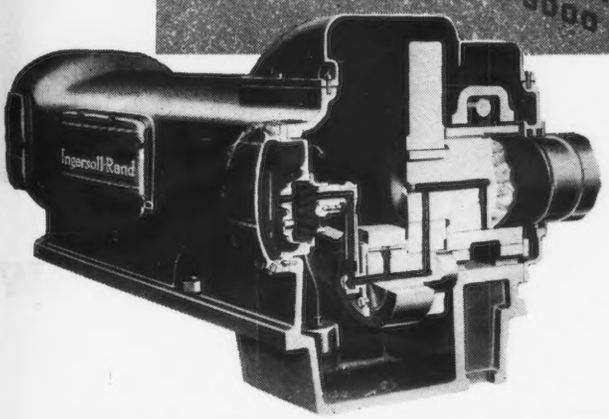
By helping business get new and better tools, you will help yourself—and you will help build a more sound, more prosperous, better America.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

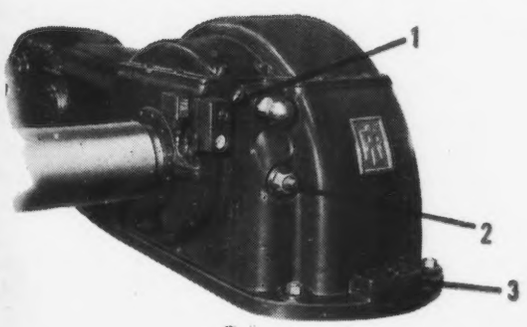
only Ingersoll-Rand makes a compressor like this!





Oil-pump drive and distribution system (patented) are combined to feed filtered oil directly to the crankpin, main bearings and crosshead.

Convenient Oil-control Center showing (1) main-bearing temperature indicator, oil-pressure gauge, and automatic oil-pressure protection, (2) main-bearing micrometer adjustment, and (3) oil filler cap.



Look at this full force-feed, filtered, lubrication system built entirely within a *sealed* crankcase which has no oil piping under pressure and no internal bearing adjustments. The machine *stays* clean inside . . . is *easy* to clean outside. Crankpin and crosshead-pin bearings are *full-floating*, precision-type, and pressure-lubricated. Main bearings have *micrometer* adjustment from *outside* the crankcase.

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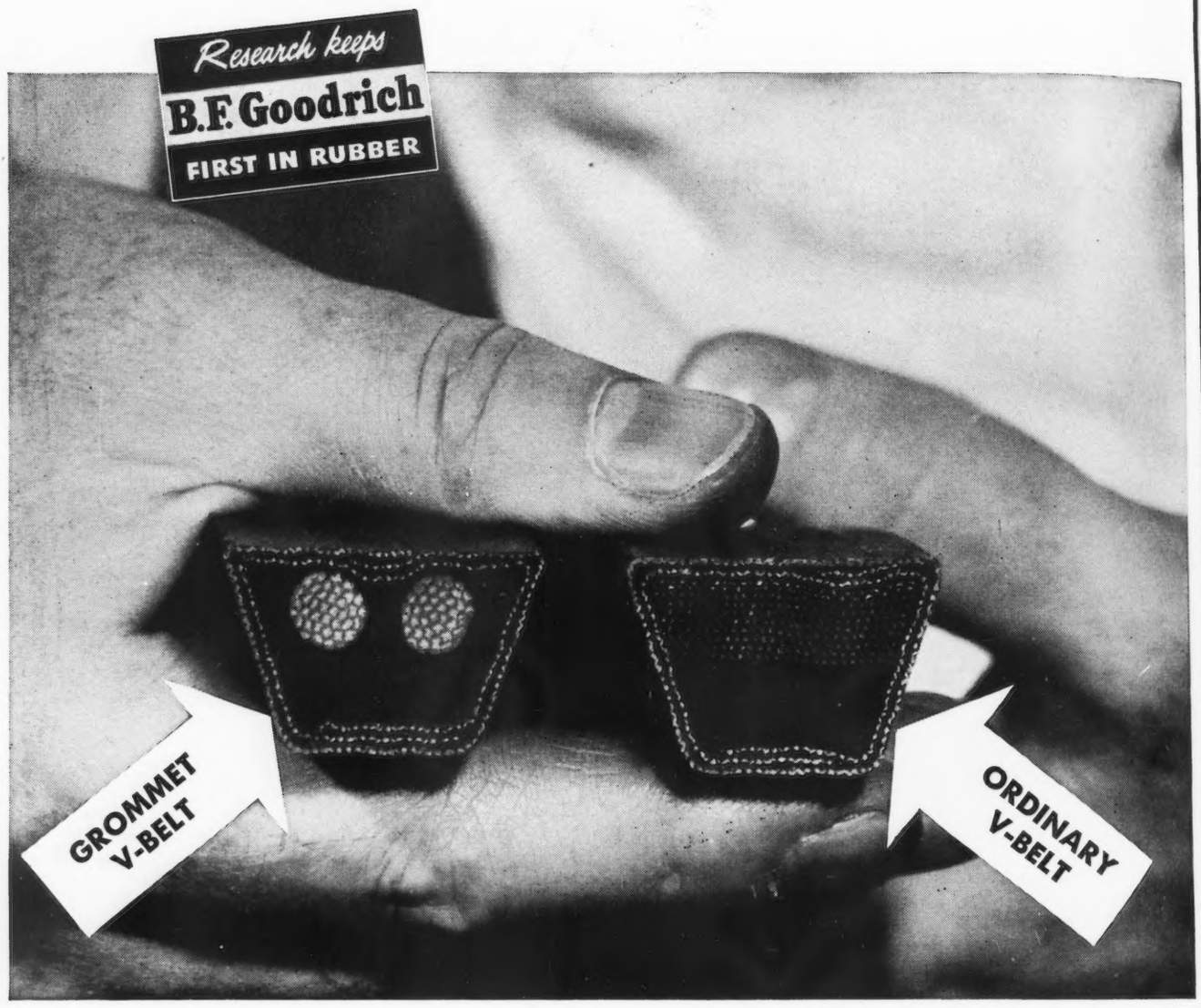
AIR POWER
The Key to Lower Production Costs



Cut V-belt costs 20 to 50% with new B. F. Goodrich grommet V-belt

Lasts longer, stands shock loads better, costs no more

A NEW patented construction by B. F. Goodrich puts all the cord material in a V-belt to work in the form of twin, endless, extra-flexible grommets — *not* cables — placed close to the driving faces of the belt (see left, above). No "lazy" cords in the interior to shirk their share of the load. Because grommets are endless they are more flexible, with no stiff section such as occurs in an ordinary cable, with spliced or overlapped ends.

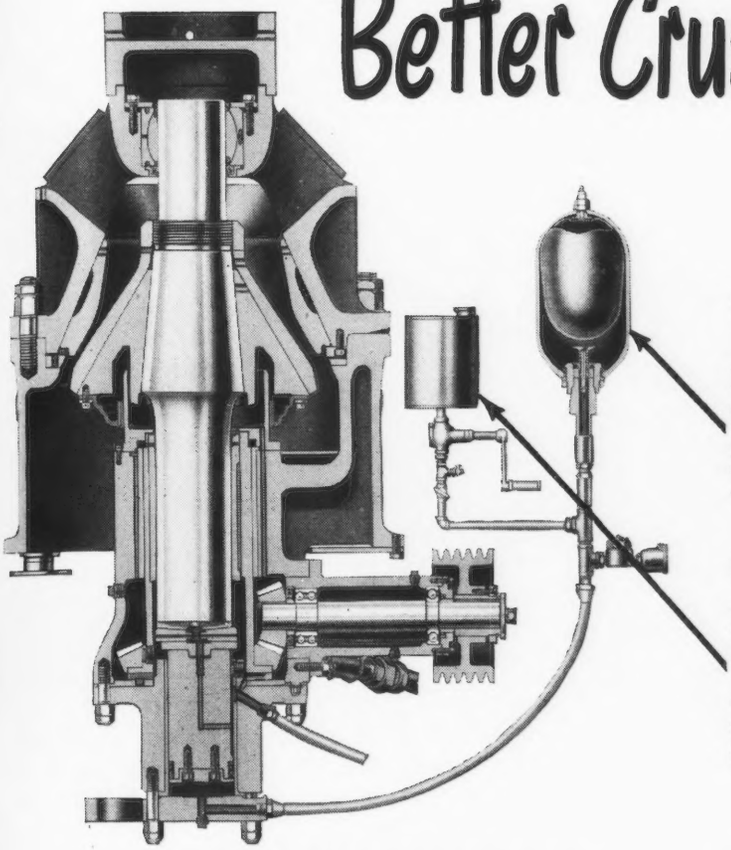
Why twin grommet construction? When an ordinary large-sized V-belt (right, above) goes into the sheave its sides are squeezed by the pulley, forcing the center cords downward and out of the line of load-carrying stress. Belt men call this "dishing", because the cord section becomes concave, like a dish. With twin grommet construction there are no center cords, no "dishing" — as the belt goes into the pulley the grommets remain on the job, close to the driving surfaces of the belt.

Grommet belts take shock load better, last longer — Laboratory and field tests show that grommet belts have a higher safety factor, greater ability to withstand shock load, than ordinary V-belts. Reasons: no "lost" or "lazy" cords to shirk, greater flexibility, better gripping power. Grommet belts tested lasted from 20 to 50% longer than ordinary V-belts. Reasons: no cord overlaps (85% of ordinary V-belts fail in the overlapped section), no sawing cords, less heat.

How to get genuine grommet V-belts — Twin grommet construction is an exclusive, patented B. F. Goodrich development — no other manufacturer can make grommet V-belts. Now available in "D" and "E" sections. To be sure you get genuine grommet V-belts see your B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

These TWIN FEATURES give you Better Crushing!



1. AUTOMATIC RESET

No "time out" to dig out your *Type R crusher* after stoppages! Automatic Reset hydraulically lowers the entire crushing head to pass tramp iron, etc. . . . then eases it back to original setting . . . without shock or costly interruptions.

2. "SPEED-SET" CONTROL

You get quick adjustment of product size with *Type R crusher*. With "Speed-Set" control you can adjust product size to exacting specifications instantly—without stopping crusher! Precision control with just the turn of a hand crank.

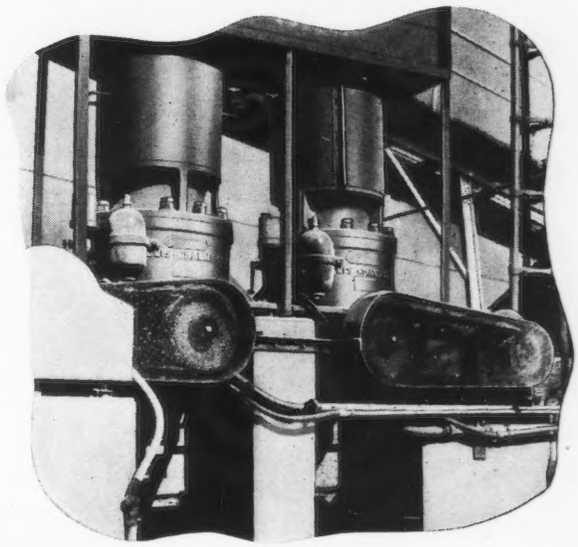
Speed-Set is an Allis-Chalmers trademark

OTHER TYPE "R" FEATURES

In the *Type R crusher* you'll have all-steel construction, with top shell and spider cast integral. Recessed spider cap results in an even distribution of feed and permits buried crusher operation.

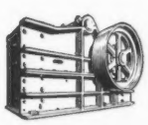
Shape of the crushing chamber is important, too. Allis-Chalmers has developed this crusher with a scientifically designed crushing chamber that gives you — by actual comparison — greater capacity and a more cubical product! It's built with an eye to easy maintenance. Self-tightening concave requires no zincing, is easy to remove. Replaceable parts are easy to install. Ask the A-C representative in your area about these and other important features of the *Type R crusher*, or send for Bulletin 07B6006D.

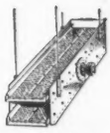
ALLIS-CHALMERS, 969A SO. 70 ST.
MILWAUKEE, WIS.

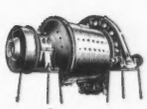


ALLIS-CHALMERS

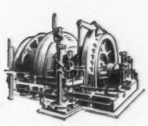
A 2550


Jaw Crushers


Vibrating Screens


Mills

Kilns, Coolers and Dryers


Hoists

. . . and Other Equipment for the Crushing, Cement and Mining Industries

More footage Drilled LESS UPKEEP COST

When you protect drills from rust and wear with Texaco Rock Drill Lubricants EP

PREFERRED!

More copper mining equipment in the U. S. is lubricated with Texaco than with any other brand.

You take rust and wear out of the category of major "headaches" when you protect your drills with *Texaco Rock Drill Lubricants EP*. At the same time, you assure more trouble-free operation (which means more footage per shift) . . . longer drill life . . . lower maintenance costs.

Texaco Rock Drill Lubricants EP have the "extreme pressure" characteristics necessary to protect moving parts against wear under the severest conditions. Furthermore, they resist washoff . . . stay fluid at low temperatures . . . keep parts free of gum and carbon formations . . . and guard against rust whether drills are running or idle.

Texaco Rock Drill Lubricants EP meet the specifications of leading rock drill manufacturers. Use the viscosities recommended for your particular drills and operating conditions.

For greater efficiency in *compressor* operation . . . for free rings, clean valves, clear airlines . . . use the recommended *Texaco Cetus, Alcaid or Algol Oils.*

Let a Texaco Lubrication Engineer help you increase drilling efficiency and economy. Call the nearest of the more than 2300 Texaco Wholesale Distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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METROPOLITAN OPERA
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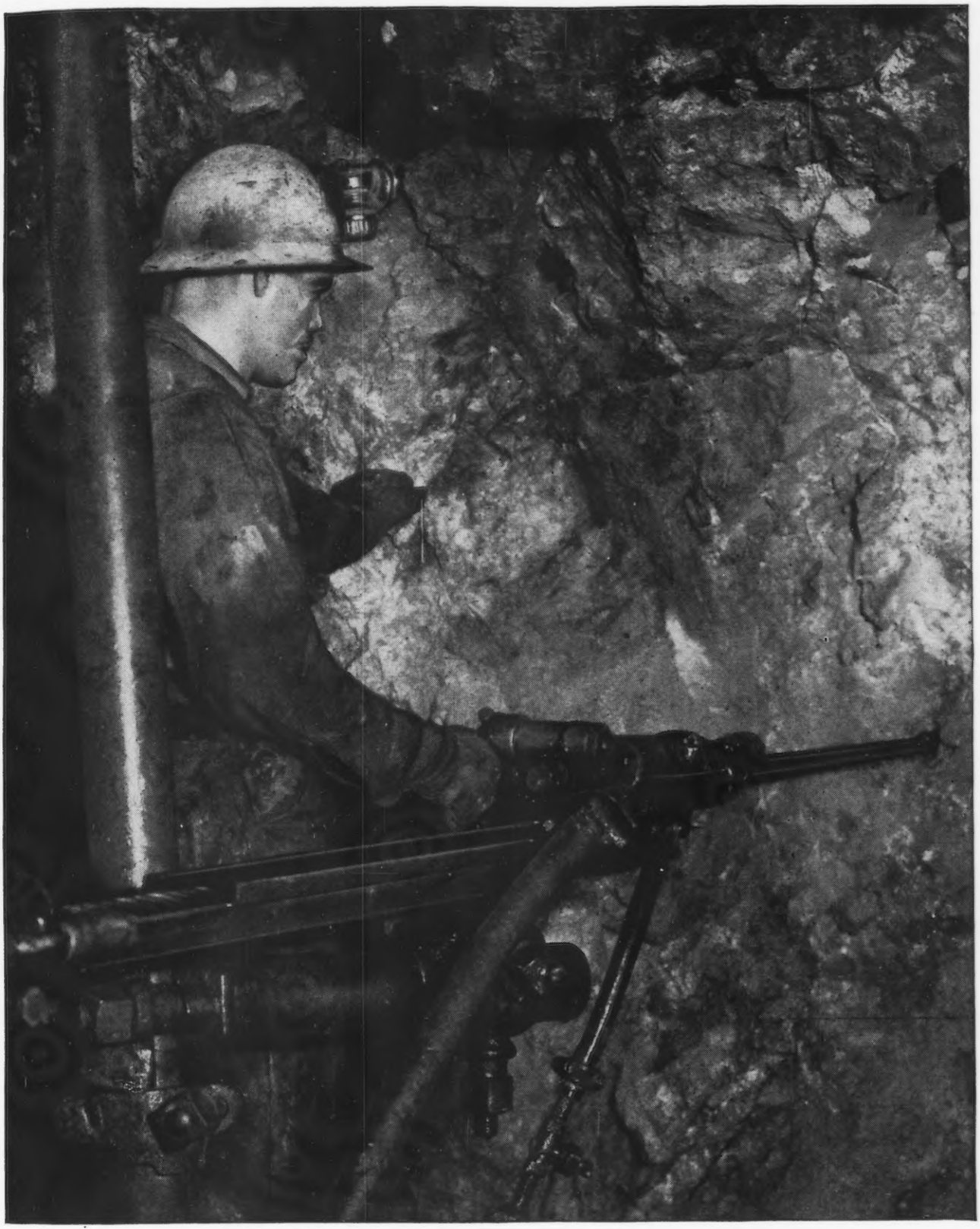
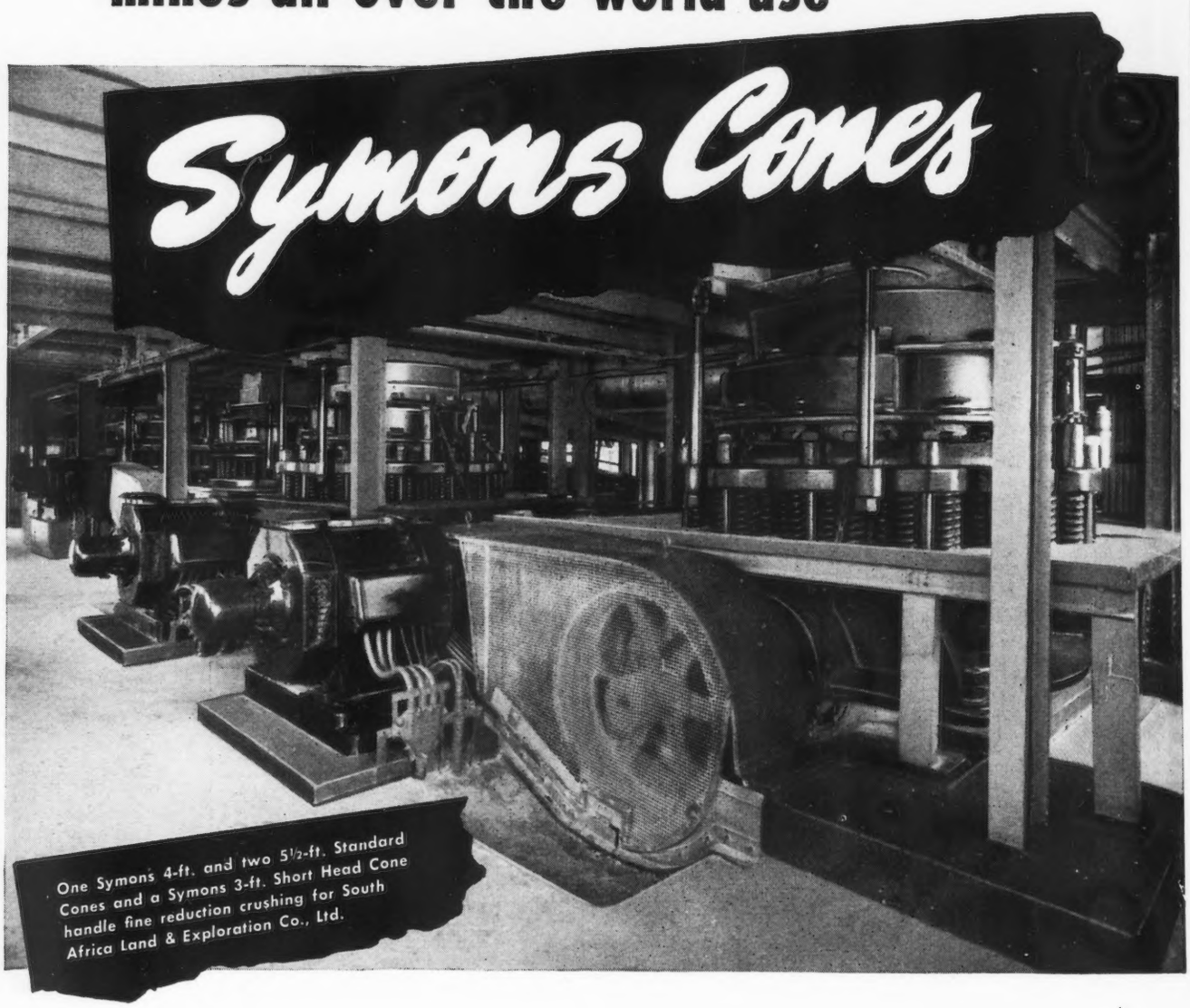


Lubricants and Fuels

FOR THE MINING INDUSTRY

For greater production of finer sizes, mines all over the world use


Symons Cones
One Symons 4-ft. and two 5½-ft. Standard Cones and a Symons 3-ft. Short Head Cone handle fine reduction crushing for South Africa Land & Exploration Co., Ltd.

TYPICAL of thousands of installations of Symons Cone Crushers by the world's metal mines is this installation of four SYMONS CONES in Africa. Here three Standard Cones and a Short Head Cone are producing a large tonnage of finely crushed product at low crushing cost.

Symons Cones are available in three types, Standard, Short Head and Intermediate, and in a wide range of sizes to fit your requirements of feed, product and tonnage.

Nordberg also offers primary Jaw and Gyratory Crushers, Grinding Mills, Rotary Kilns, and Vibrating Screens for the processing of ores and minerals.

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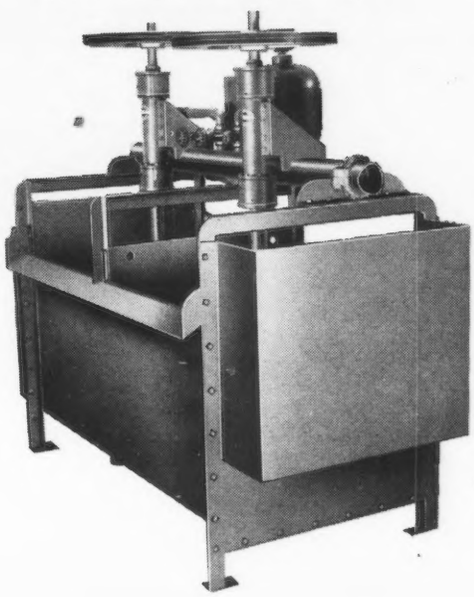
SYMONS CONE CRUSHERS

on the job in AFRICA

Rhodesia, South Africa, is another of the world's important mining centers where AGITAIR is on the job, performing an efficient and profitable operation. Here, as elsewhere over the globe, AGITAIR is producing outstanding concentration results — results that win acclaim from management, engineers and operators. In fact, it's through 35 years of collaboration with these experts in the field that AGITAIR has become first choice of mining companies that are always on the lookout for new and better flotation equipment. This wealth of world-wide experience and application is an important part of the know-how that goes into your beneficiation problems. Write today for new illustrated AGITAIR literature. Your correspondence is invited.

AGITAIR
FLOTATION MACHINE



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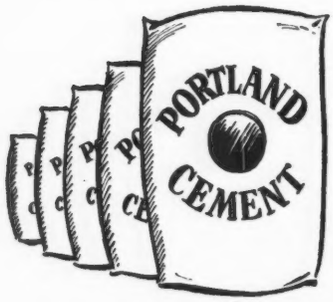
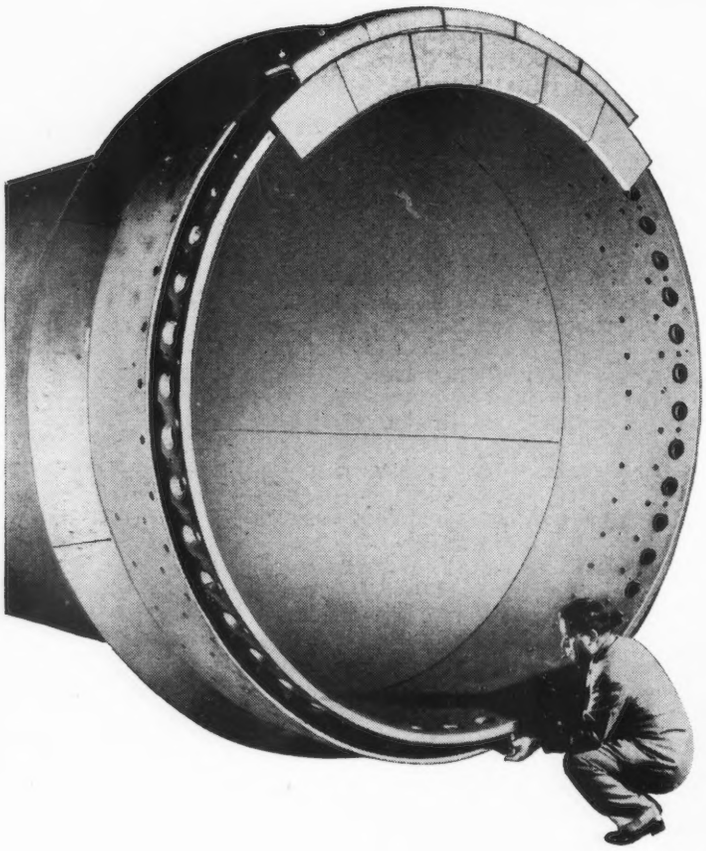


Looking for Increased Kiln Production?



CHECK THESE CONSTRUCTION FACTS

This modern air-cooled kiln end is only one of many Allis-Chalmers advances in *rotary kiln* engineering that help increase capacity and boost your profits.

The cooled, segmental alloy steel brick retaining ring resists highest temperatures, prevents shell warpage and refractory troubles. Longer kiln and refractory life . . . less down-time . . . more production!

Other Allis-Chalmers developments that make *rotary kiln* operation more profitable: modern heat recuperation equipment . . . centralized control of combustion . . . constant delivery feeders. Heavy, all-welded Allis-Chalmers kiln shells (extra thick under riding rings) prevent distortion, reduce deflection.

AND THESE PERFORMANCE FACTS

You can be sure of top production and economy when you call on Allis-Chalmers for rotary kiln recommendations. A-C has built hundreds of kilns — has had over fifty years experience in engineering complete rotary kiln installations. Every new kiln recommendation is based on this invaluable backlog of experience plus a thorough analysis of your specific requirements. A-C laboratory testing and shop facilities are unexcelled. For more information, get in touch with the A-C representative in your area or send for **Bulletin 07B6368.**

ALLIS-CHALMERS, 969A SO. 70 ST.
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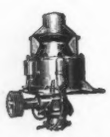
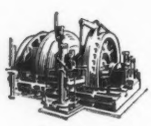
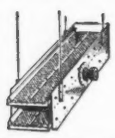
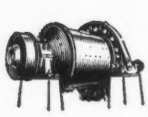
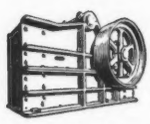
ALLIS-CHALMERS


Gyratory Crushers


Hoists


Vibrating Screens


Mills


Jaw Crushers

. . . and Other Equipment for the Crushing, Cement and Mining Industries

AT THE LEFT, ABOVE, you see part of an ordinary wire screen—woven like cloth—each wire has a continuous wave... and in service, *the high spots get the wear.*

At the right, you see a new Roebling way of making wire screens... the wire lies *flat* except for short crimps at the intersections. This modern screen is called ROEFLAT...has 75 per cent more wearing surface... prolongs the working life of screens as much as 90 per cent!

And ROEFLAT Aggregate Wire Screens save you money in other ways. Their smooth, level surface lessens clogging and blinding. Their precision openings assure uniform grading and increase your screening efficiency.

Wherever ROEFLAT is recommended, its advantages can be enjoyed in practically any construction, such as ROETON, ROESLOT or square mesh, with ⅛" openings or larger. Investigate ROEFLAT before placing your next order for screens. Write for Catalog W-903.

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ROEBLING

A CENTURY OF CONFIDENCE

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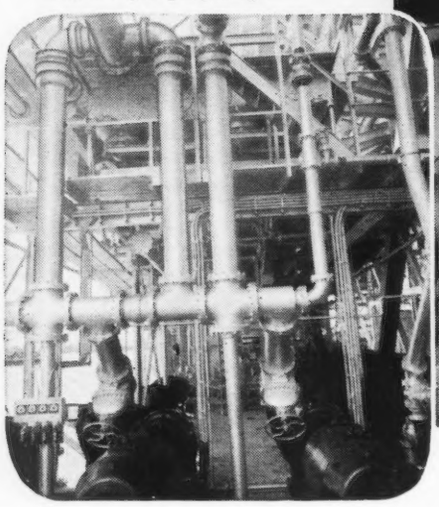
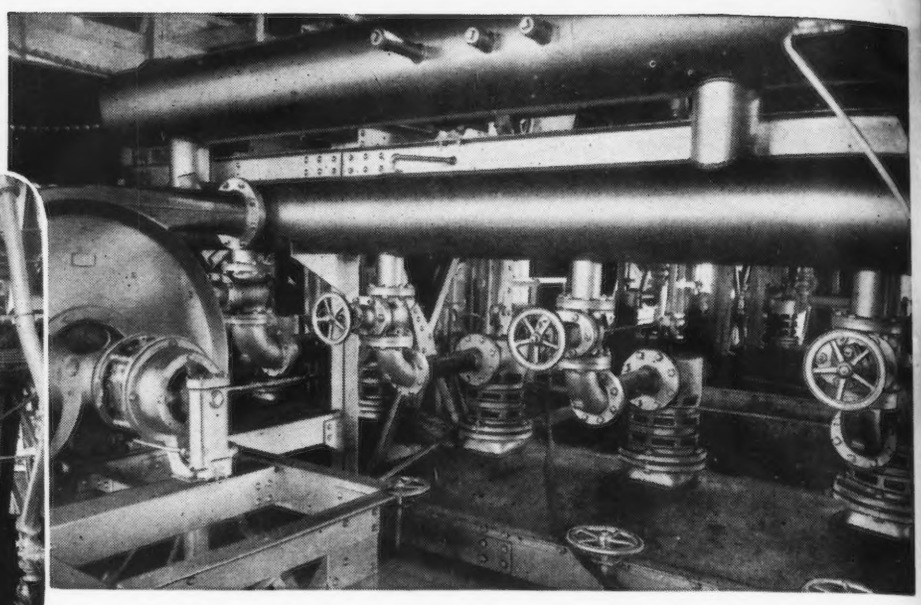


JIG PUMPS *on the world's largest tin mining dredge, equipped with Crane 12-in. Iron Body Gate Valves and 125-pound flanged fittings.*



WET CLEANING PLANT *showing air supply lines from centrifugal compressors to coal washing system. Valves and other piping materials are from Crane.*

You name it . . . CRANE supplies it . . . Everything in piping for mines

SEEPAGE PUMPS *in mine working under 1100-ft. head, equipped with 150-pound Crane steel gate and check valves, and fittings.*

Above ground or below . . . on new piping installations or for routine replacement work . . . the simplest way to get the piping you need is to specify Crane. One catalog gives you quick and easy selection from the world's most complete line of quality piping equipment. One order through well-stocked Crane Branches or Wholesalers supplies all valves, fittings, accessories, fabricated piping and pipe needed for the job.

When you standardize on this **Single Source of Supply,** you simplify all piping procedures—everything from design to erection to maintenance work. **Undivided Responsibility** for materials . . . brass, iron, steel or alloys . . . helps you to get better installations, avoids needless delays. And the **Unsurpassed Quality** of every item bearing the name Crane assures uniform dependability throughout every part of your piping systems.

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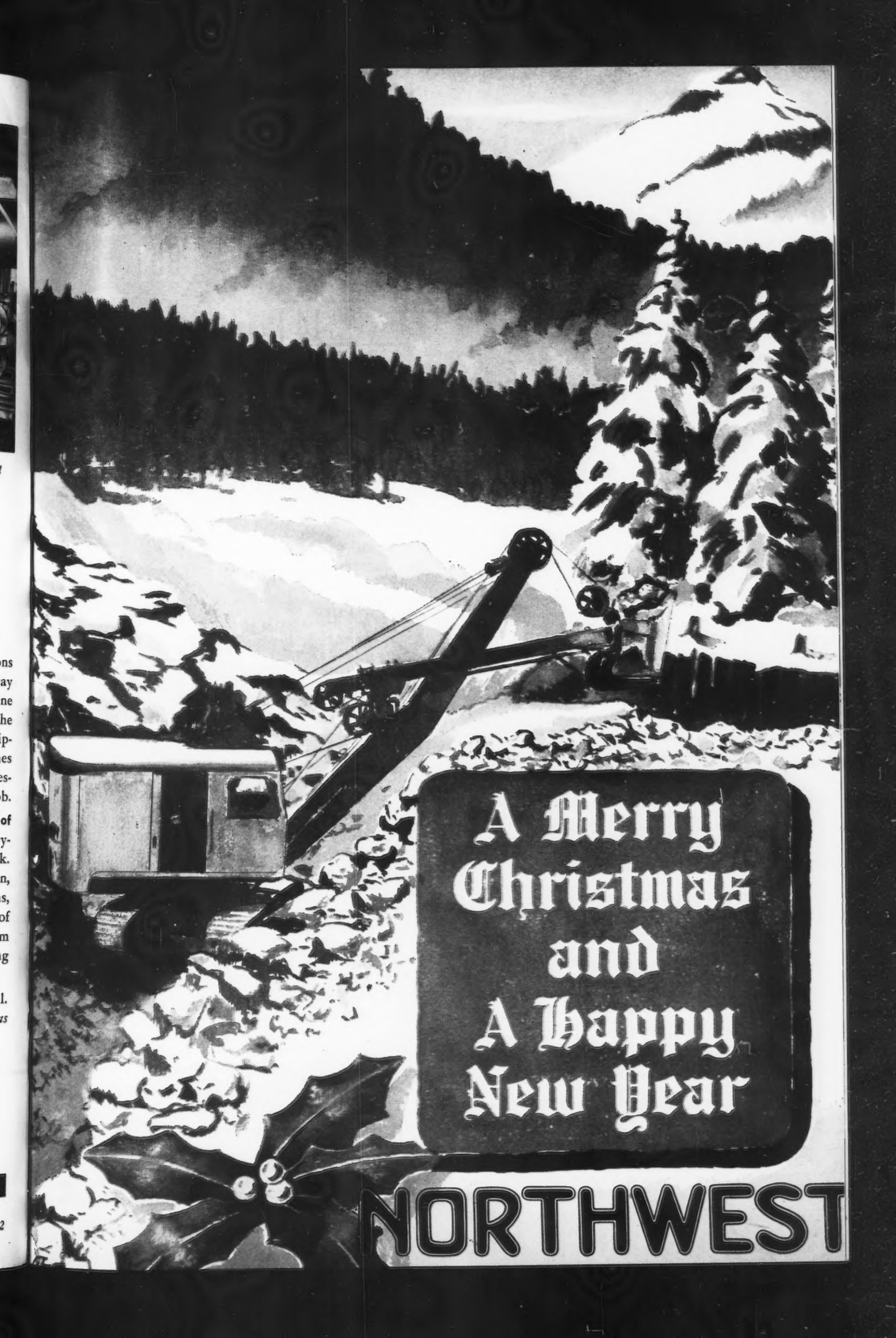
FOR EVERY PIPING SYSTEM


A Merry
Christmas
and
A Happy
New Year
NORTHWEST

Get over 6 times the wearing life with WEMCO Molded Rubber Parts!

Results from a Southwestern Concentrator

Metal wearing parts	WEMCO rubber wearing parts
14 days life	95 days life

WEMCO
"Best in Sand Pumps"

New WEMCO molded rubber parts fit all WEMCO and WEMCO-type sand pumps.

Recent operation figures from a Southwestern concentrator show greatly improved operating economies with the new Wemco Molded Rubber Parts in their 2" Wemco Sand Pump.

The pump is handling mill tailings — 170 TPD dry solids. The Wemco Pump handles a pulp of 38% solids, containing 5% +65 mesh. Discharge head of pump is over 100'.

These 2" Wemco Molded Rubber Parts lasted 6.78 times as long as the metal parts.

Investigate Wemco Molded Rubber Parts now — they improve efficiency, reduce power consumption and lower maintenance costs.

***IMMEDIATE DELIVERY** on 2" molded rubber parts*
OTHER SIZES SOON!

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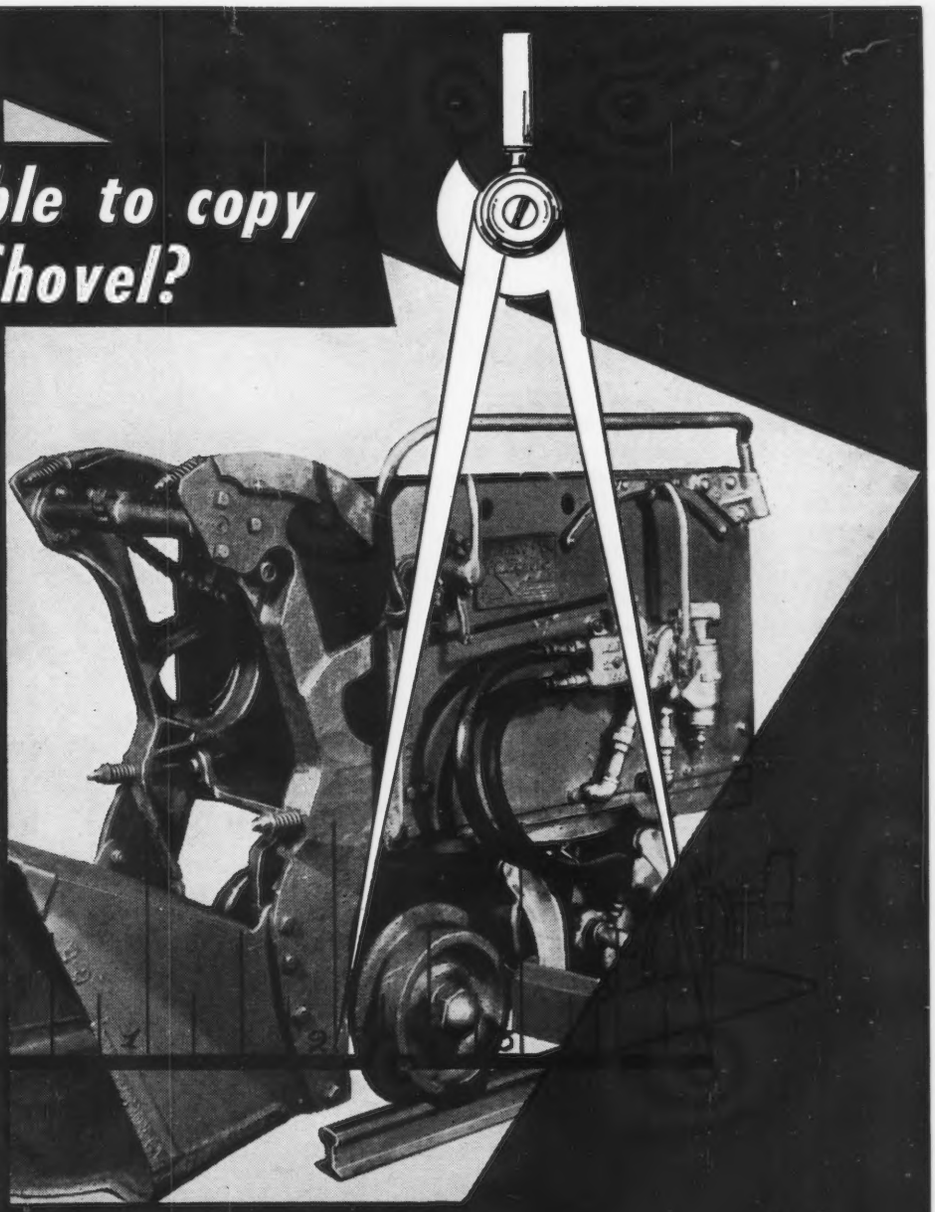
Is it possible to copy a Rocker Shovel?



Yes! as far as outward appearance goes. In fact — it's been done. It's easy to design something that has already been designed, change it a little and call it your own.

The inevitable trap that catches all "follow-ers" who would pick-up and take-off at the middle of the race is lack of experience.

Experience, at Eimco, dates back to the beginning AS WE ARE THE ORIGINATORS AND BUILDERS OF THE ONE ORIGINAL OVER-HEAD TYPE OF LOADING MACHINE Many were the trials and errors before even machine No. 1 made its appearance in the world. We know why we build RockerShovels the way we do — many present day "would-be" contemporaries are still using features we threw away with the first experimental model.

Thousands of satisfied customers point to Eimco, (many after trying other makes) — they all say, "You can't beat an Eimco."

EIMCO

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

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AFFILIATED COMPANIES: SOCIETE EIMCO, PARIS, FRANCE
EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
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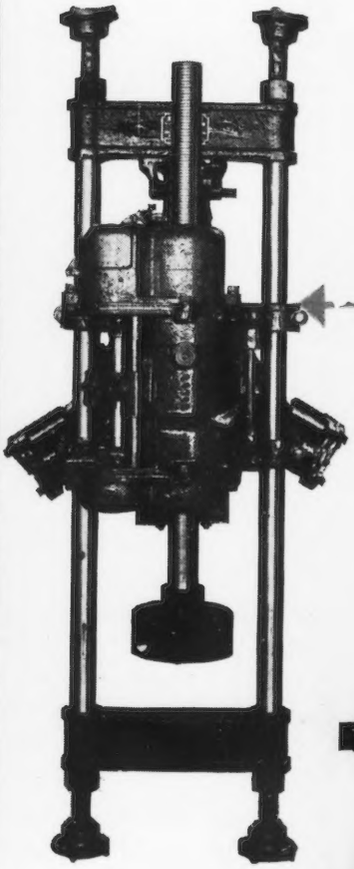
EFFICIENT JOY EQUIPMENT

IN U. S. SMELTING PROPERTIES



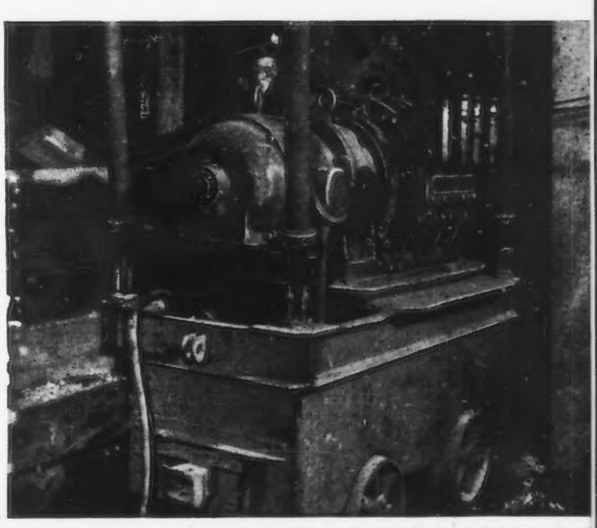
JOY AAF-212 Double Drum Slusher in Lark Section, U.S.S.R. & M. Co.

The U.S.S.R. & M. Co. uses JOY CORE DRILLS, ROCK DRILLS, SLUSHERS, HOISTS and LOADERS like those pictured here

For Top Efficiency specify "JOY"

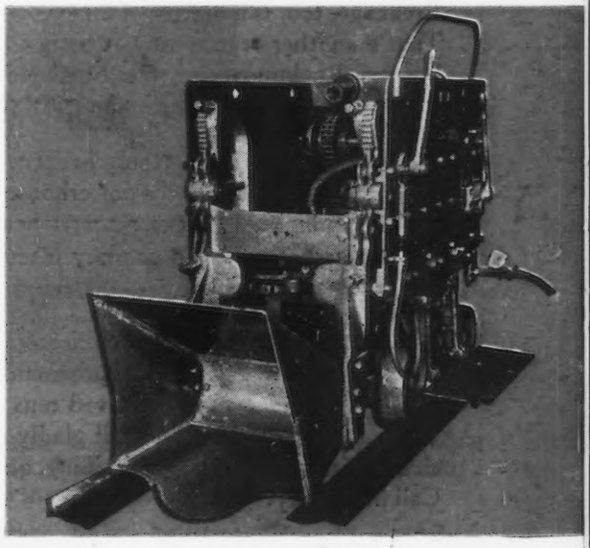
WRITE FOR BULLETINS

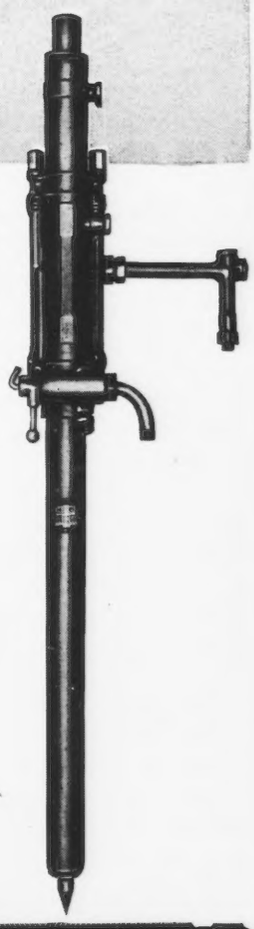
JOY F-113 Single Drum Hoist in Lark Section, U.S.S.R. & M. Co



JOY BF-212 Double Drum Slusher in Lark Section, U.S.S.R. & M. C

JOY HL-3 Shovel Loader for hard rock and ore.

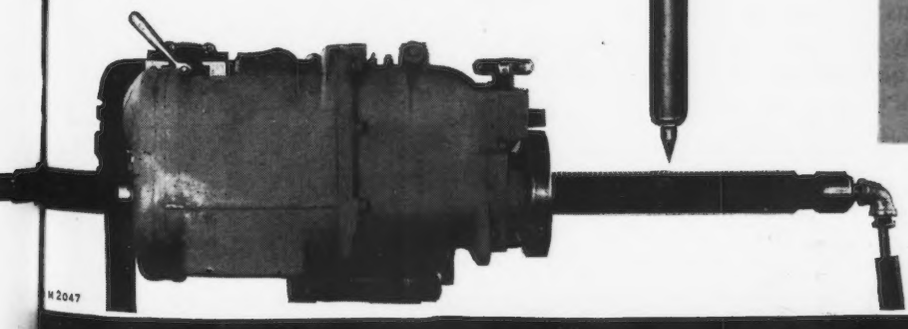




JOY SILVER STREAK S-91 Stoper. Cadmium plated inside and out for easier, quicker run-in and protection from corrosion. Has the "thumb-flip" control for safe, easy spotting, and the patented Joy "Dual-Valve"—which makes air do more work.

JOY 22-HD Core Drill for testing on the surface or underground (as illustrated) in all types of formations. A rugged, heavy-duty drill, it nevertheless is portable and relatively lightweight due to its compact design and the use of modern alloys.

The JOY HS-15 Blast Hole Drill for high-speed drilling underground or on the surface. Drills either blast holes or cores, features the efficient "in-line" drive and reversible mounting.



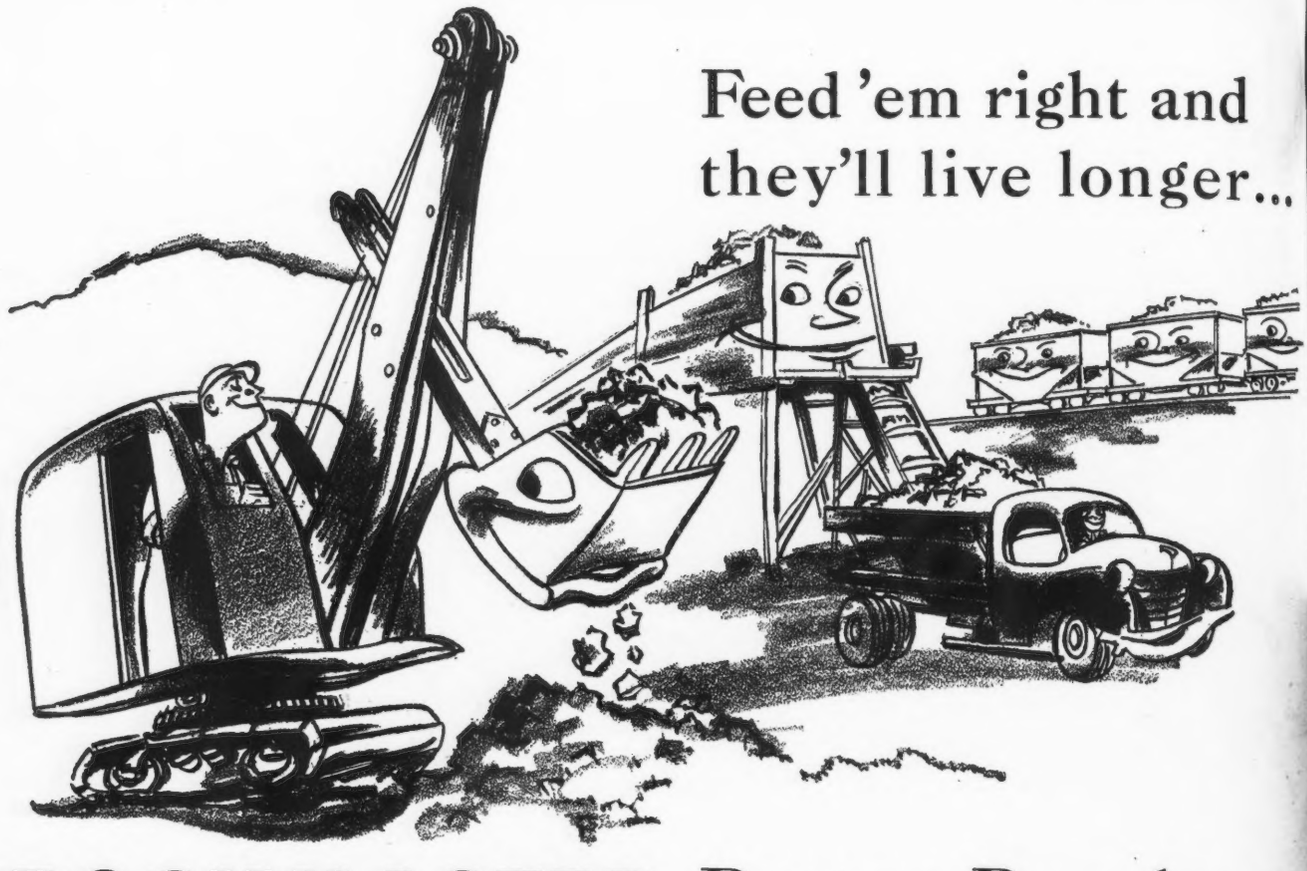
M 2047

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO



ROCKMASTER Better Breakage is Better Bucket Food

Breakage, too, is a matter of digestion—for your removal equipment. That's another reason why it pays to use the Rockmaster Blasting System. Rockmaster's better breakage pays off in longer equipment life and speedier handling in quarries, strip pits and mines.

Buckets bite into more evenly broken, smaller rock—and that means less strain on your shovel's powerhouse as well as on the bucket itself. Loaders, mine cars, trucks, all carry heavier loads under lighter strain. Big rocks that require secondary blasting are cut to a minimum. It's full speed ahead after a Rockmaster millisecond delay blast.

Rockmaster is the original millisecond delay blasting system—pioneered by Atlas. No special equipment is needed. For some operators, Rockmaster methods have saved tens of thousands of dollars a year. Your Atlas representative will gladly discuss ways that Rockmaster can be of help to you in your mining, quarrying and construction work. Call him today.

THE GREATER SAFETY OF ATLAS MANASITE DETONATORS

Less Bark — *More Bite*

Remember, the Atlas Rockmaster Blasting System also incorporates Atlas Manasite. This means decreased sensitivity to impact and friction — no sacrifice in efficiency but less chance of accident.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

One P&H after another

These two P&H Model 1400 Electric Shovels (4 cu. yard capacity) team up in this open pit mine at Tahawus, New York for the National Lead Company.

Yes, the new P&H Electric Shovels are following each other quickly these days — in one location after another. You'll find the reasons for it in P&H's Added Values.

"Magnetron" control is a typical example. Here, through the ingenious use of a proven magnetic principle within the controllers themselves, P&H has achieved stepless power regulation — smoother than you've ever known — for all motions in crowd, hoist, swing, and propel. What's more, multiple electrical contacts, resistor panels and separate exciters are entirely eliminated. And there are no terrific electrical surges to invite burn-outs and trouble.

Add to this, P&H's Magnetorque drive, independent propel, air-filtered cab and other outstanding advancements. Leadership in design means leadership in performance. Send for literature!

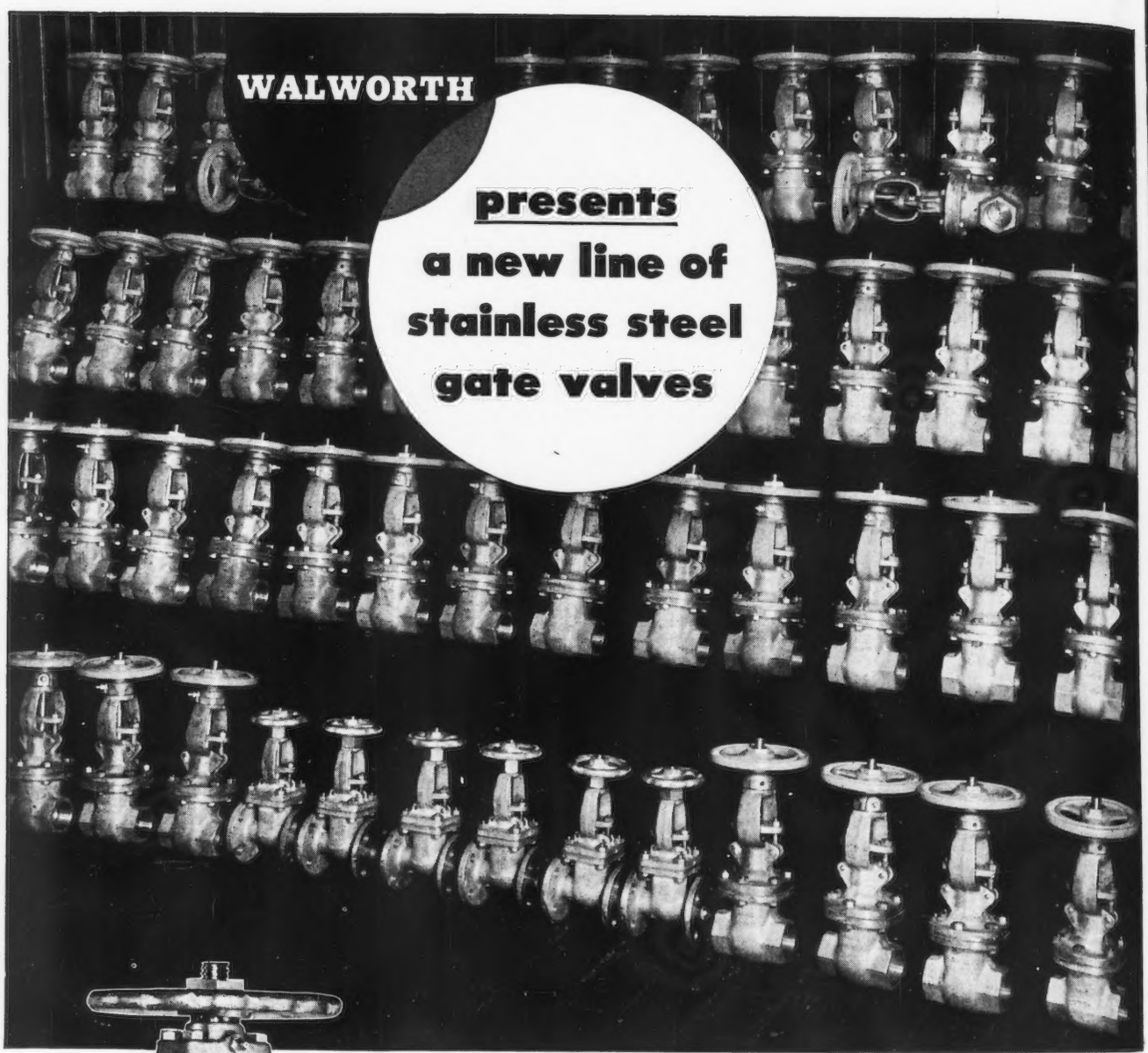
Excavators built in sizes ½ to 6 cu. — Gaso-Diesel and ic power.

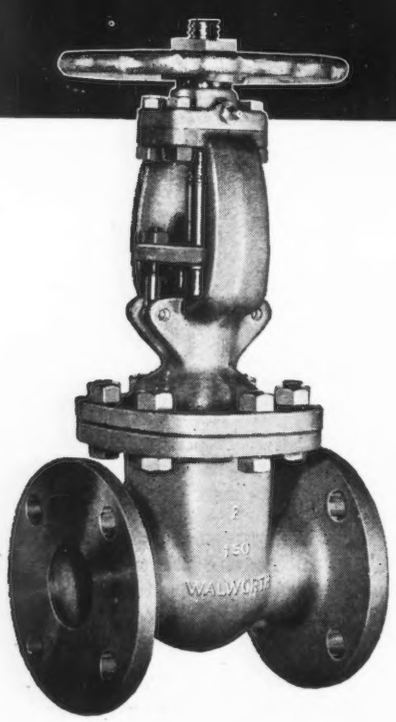
P&H ELECTRIC SHOVELS
4454 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

Every Third P&H Electric Shovel Sold Is a Repeat Order

LEADING THE FIELD IN ELECTRIC SHOVEL DEVELOPMENT





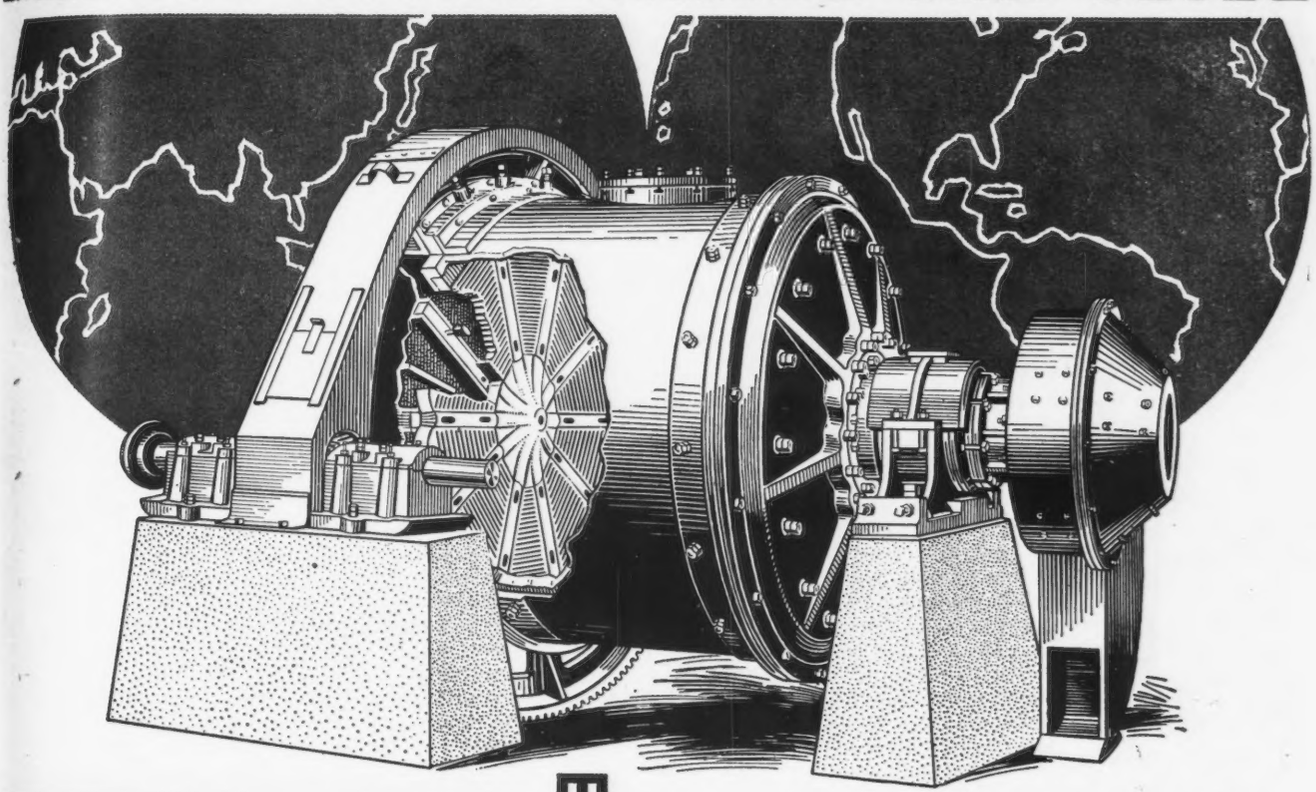
Walworth's *new* line of Stainless Steel Gate Valves is an excellent modern example of Walworth valve leadership. These valves combine the latest features of advanced valve design, with the traditional manufacturing skill which has made Walworth valves famous throughout the world.

See your Walworth distributor for further information on Walworth Stainless Steel Gate Valves, or Walworth's complete line of valves and fittings in other ferrous and non-ferrous metals.

WALWORTH
valves and fittings
60 EAST 42nd ST., NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

MARCY MILLS GIRDLE THE GLOBE



482 OUTSIDE U. S. A.	
Alaska	10
Canada	129
Mexico	81
Cuba	9
Latin Amer.	76
Europe	74
S. Africa	27
Far East	42
Philippines	34

Many of these are repeat orders

THE wide acceptance of Marcy Mills both in the United States and in the far corners of the world is based upon certain principles of design and operation.

In an open-end Marcy Mill the difference in elevation between the incoming feed and the lower point of discharge causes the fines to travel faster than the coarser particles. Thus the finished material is removed more quickly, better exposing the coarser material for further grinding.

With impact on a smaller body of ore, maximum drop for impact and far less cushioning, more rapid grinding is effected. Obviously, in closed circuit grinding in open-end Marcys there are many more circuits per hour. Equally obvious are the accruing advantages of increased tonnage, lower per ton cost and more satisfactory metallurgy in any subsequent flow-sheet operations.

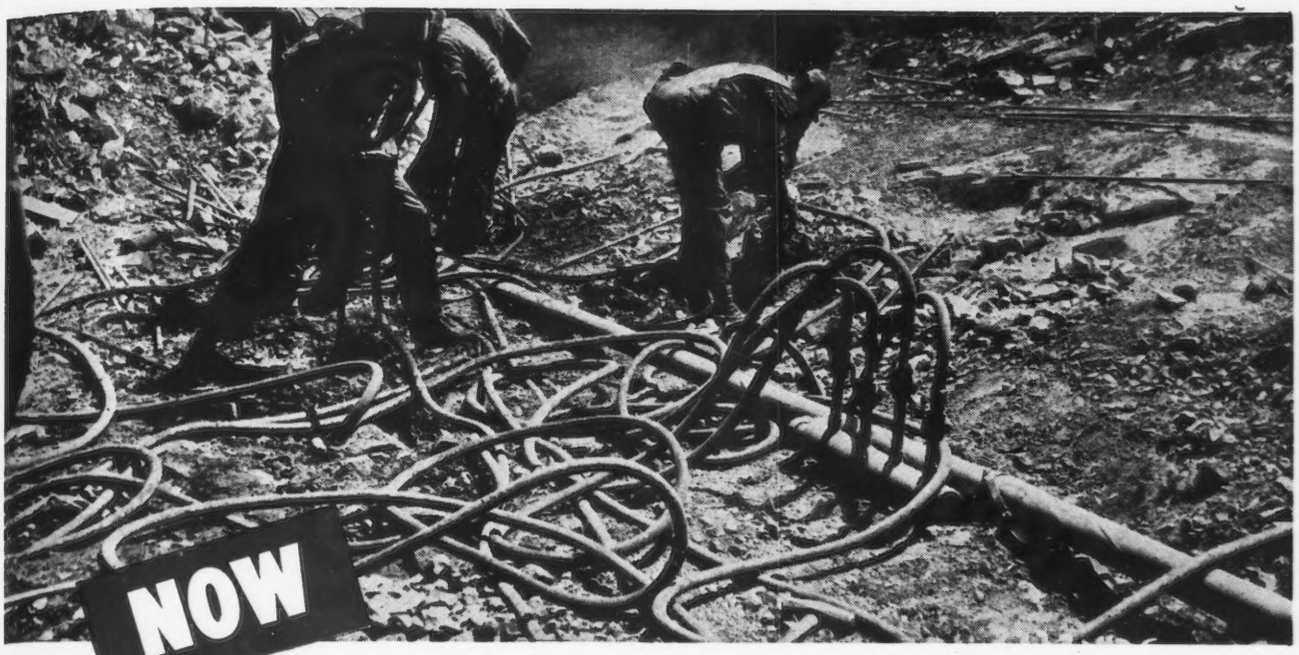
● Permit us to present field records which substantiate these statements.

Denver, El Paso, Salt Lake City, 1775 Broadway, N. Y.
Canadian Vickers, Ltd., Montreal; W. R. Judson, Santiago & Lima
The Edward J. Nell Co., Manila, P. I.

Massco-Fahrenwald Flotation Machines; Wilfley Tables; Rock Bit Grinders; Density Controllers; Pinch Valves; ASSAY AND LABORATORY SUPPLIES & EQUIPMENT; COMPLETE MILLING PLANTS.

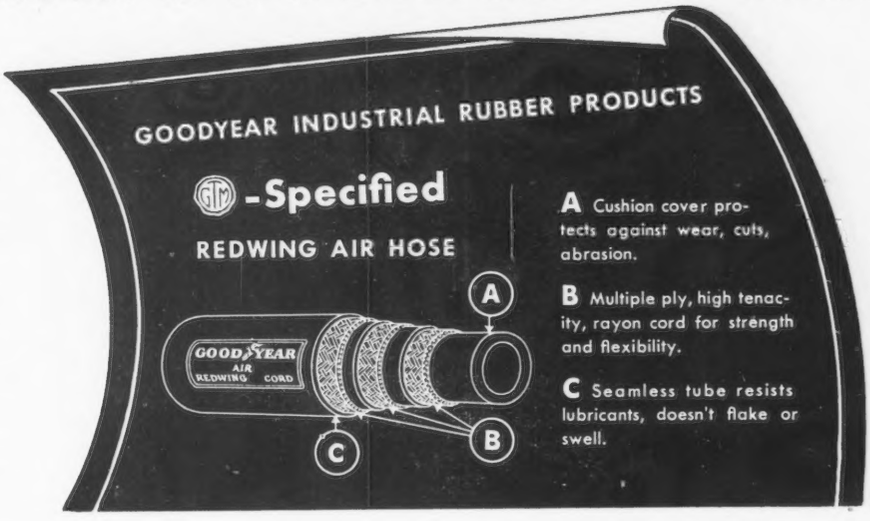
The Mine & Smelter Supply Co.

THE Preformed Challenge
Here's a CHALLENGE to the few who have not used Preformed Wire Rope:
•
Put Preformed to work on your job.
See for yourself if it isn't
• easier to install
• safer to use
• longer lasting
. . . and see if it doesn't
• COST LESS TO USE
That's the Preformed challenge



AIR HOSE with a CUSHION COVER

Cuts, Gouges, Abrasion "BOUNCE" Off Goodyear's NEW Redwing Air Hose



Now Goodyear offers you a radically improved line of Redwing Air Hose — a hose with a cover that is tire-tread tough, yet cushiony enough to resist heavy impacts without cutting or gouging. Hard knocks, digs, abrasion and wear literally "bounce" off this brilliant red stock. It's a rugged, springy protection that brings you longer, better air hose service in rough-and-tumble mining, quarry and construction use.

Under this new, super-strong resilient cover, there's more strength and durability to make Redwing your best buy in air hose. Multiple ply, high tenacity, rayon cord reinforcement gives the body a combination of toughness and flexibility that makes Redwing Air Hose easily handled and always dependable. And the seamless tube is proof against hot or cold lubricants that cause ordinary hose to swell and flake.

Either for pneumatic tool service or heavy-duty use, Redwing Air Hose will cost you less in the long run. Ask the G.T.M. — Goodyear Technical Man — for full details, or write Goodyear, Akron 16, Ohio.

FOR HOSE, BELTING, MOLDED GOODS, PACKING AND TANK LINING built to the world's highest standard of quality, phone your nearest Goodyear Industrial Rubber Products Distributor.

Redwing—T. M. The Goodyear Tire & Rubber Company

GOODYEAR

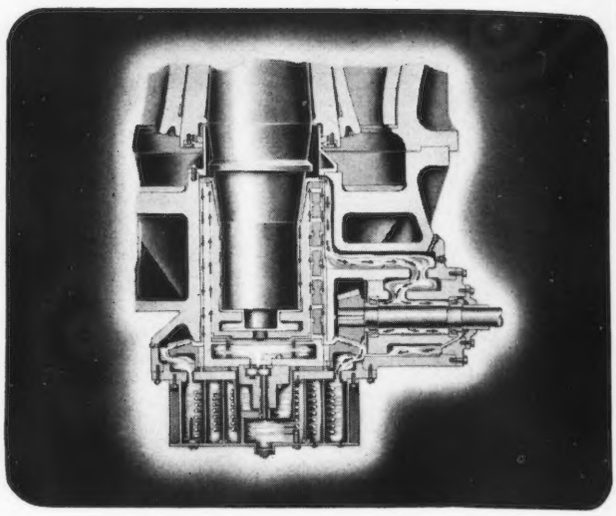
THE GREATEST NAME IN RUBBER

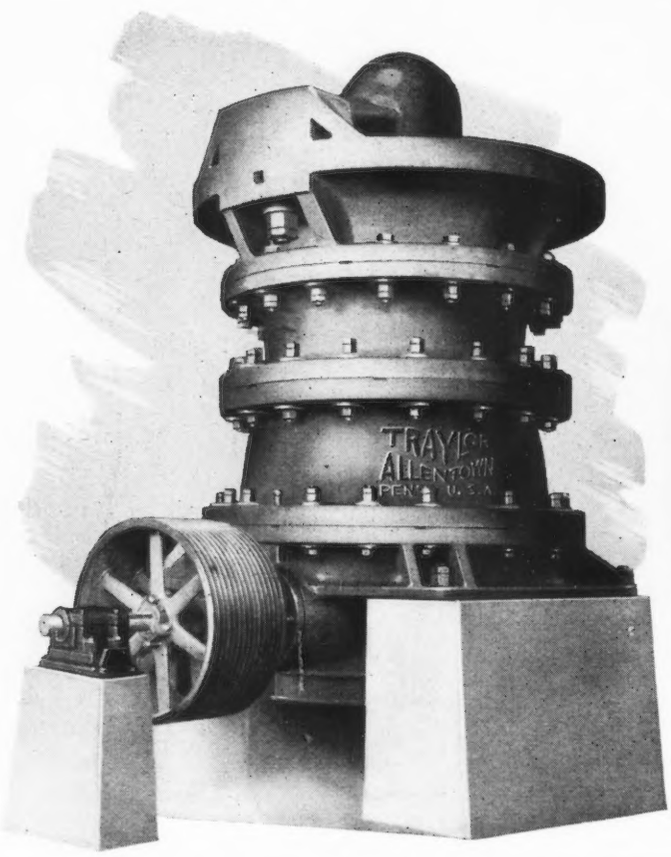
First Choice

when Huge Tonnage is a Primary Problem

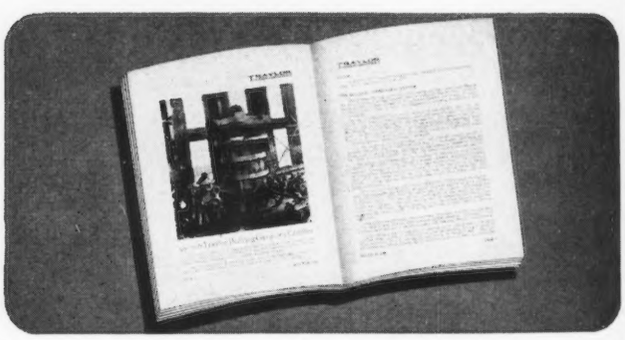
Many plants of less than 10,000 tons daily capacity, and *all larger plants*, will operate with greater efficiency using a Traylor Gyratory Crusher for primary breaking. That's because of its very large capacity in relation to power required.

But, tremendous capacity is not the only advantage of the Traylor Gyratory Crusher. The receiving openings of all models are ample. This teams them efficiently with all large capacity material handling equipment. Operated at, or near, capacity, the power they use is extremely low per ton. Simple design and superb construction reduce maintenance . . assure long, trouble-free operation.





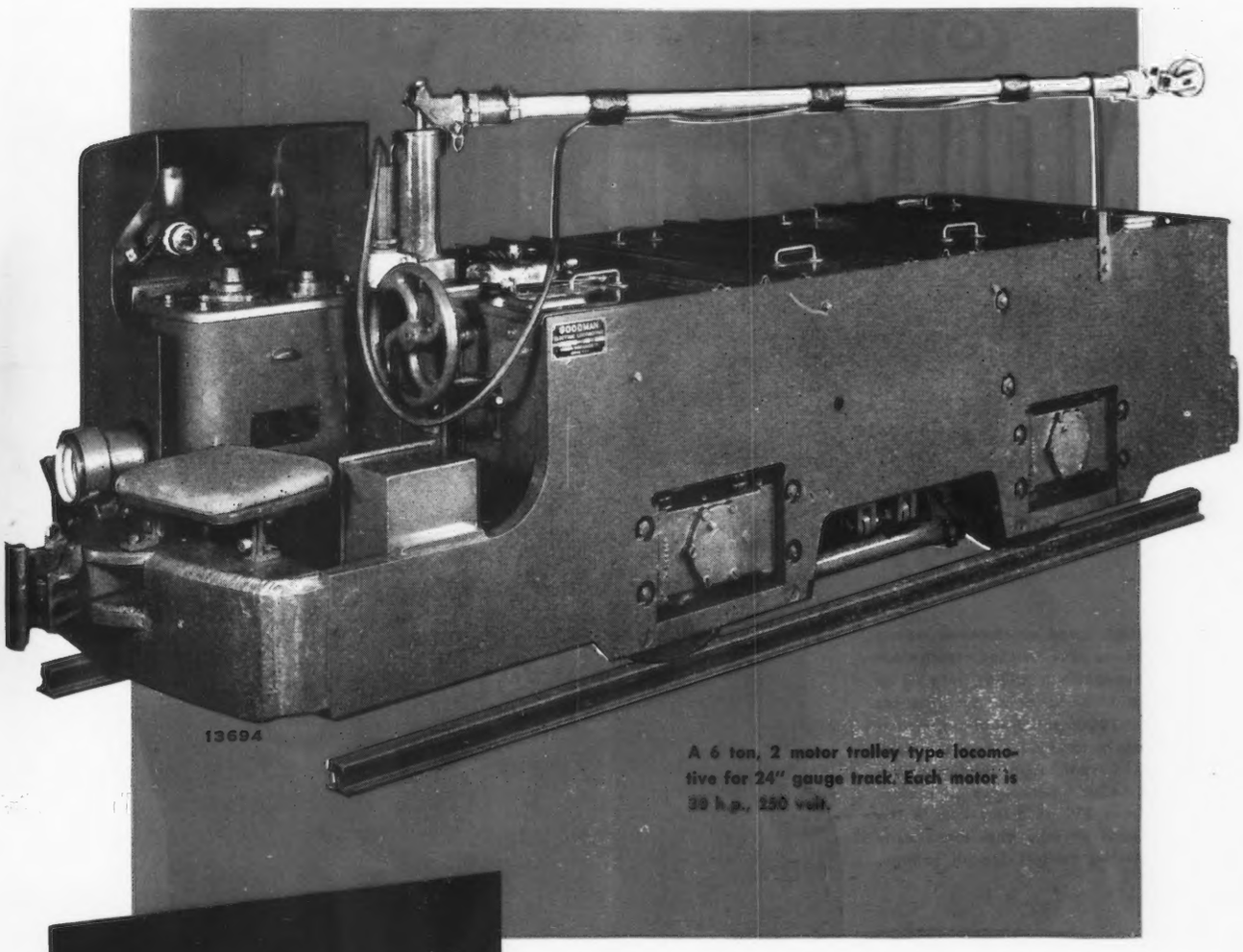
Among the features of these fine crushers is a positive, automatic, pressure-feed lubrication system. Every moment of operation the full length of the eccentric bearing and the main pinion are bathed in cooled oil from a generous reservoir kept dust-free with Traylor's exclusive, effective dust seal.



Bulletin 4100 contains a complete description and pictures of the Traylor Gyratory Crusher as well as basic tables and information to help you make your selection of a crusher on the basis of best operating practice. Write for your copy today.

TRAYLOR ENGINEERING & MANUFACTURING CO., 104 Mill St., Allentown, Penna.
Canadian Manufacturer — Canadian Vickers, Ltd., Montreal, Que., Canada

TRAYLOR *Gyratory Crushers*



A 6 ton, 2 motor trolley type locomotive for 24" gauge track. Each motor is 20 h.p., 250 volt.

GOODMAN METAL MINE LOCOMOTIVES

. . . a complete line of trolley, storage battery and combination types to meet any condition of service. A Goodman sales engineer will be glad to recommend units for your transportation system.

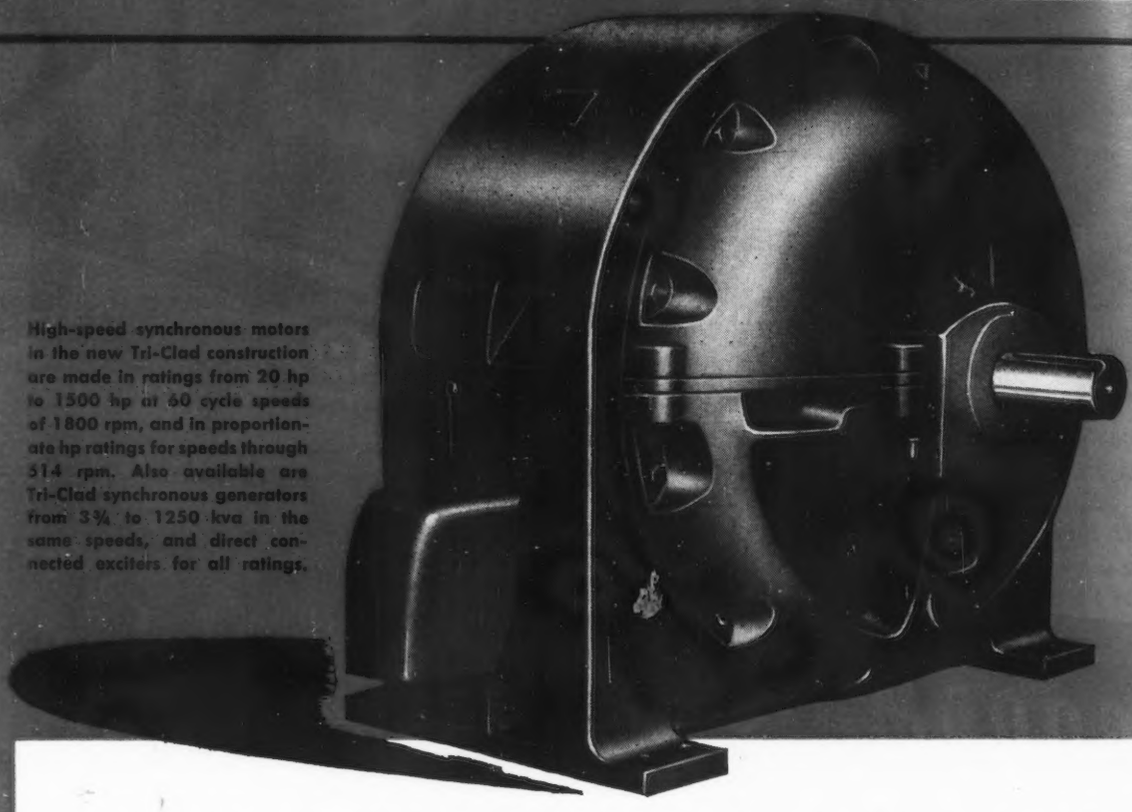
GOODMAN MANUFACTURING COMPANY

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England — UNITED STEEL COMPANIES, LTD.

NOW TRI-CLAD

REG. U.S. PAT. OFF.



High-speed synchronous motors in the new Tri-Clad construction are made in ratings from 20 hp to 1500 hp at 60 cycle speeds of 1800 rpm, and in proportionate hp ratings for speeds through 514 rpm. Also available are Tri-Clad synchronous generators from 3¾ to 1250 kva in the same speeds, and direct connected exciters for all ratings.

Here's what *TRI-CLAD* protection brings to your ore processing jobs

Extra protection against physical damage. No longer need you provide special drip covers over your motors. Tri-Clad motors are fully protected against dripping liquids, as well as falling objects or accidental blows. Their rigid cast-iron frames and end shields have no direct openings above the center line.

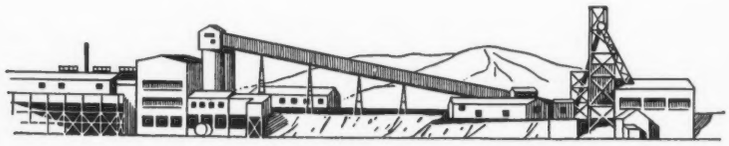
Extra protection against electrical breakdown. For maintained dielectric strength, motor windings are of Formex® wire, highly resistant to moisture, solvents and heat shocks. Specially-selected insulating materials assure solid bonding of form-wound coils, and reduce the chances of electrical failure.

Extra protection against operating wear and tear. Redesigned bearings are completely enclosed in cast-iron housings that guard them from water, dust, and dirt. Double-end ventilation provides uniform cooling. Pressure-relief regreasing makes for effective lubrication. Wiring is simplified by a new conduit box, and tough, flexible leads.

GE

TRI-CLAD MOTORS

REG. U.S. PAT. OFF.



. . . to help cut ore processing costs electrically!

TRIPLE PROTECTION

in a GE

HIGH-SPEED SYNCHRONOUS MOTOR!

Here it is—General Electric's new line of Tri-Clad high-speed, drip-proof synchronous motors! Now you can get, for your toughest ore concentrating and smelting jobs, triple-tough motors with proved extra protection features. For driving your pumps, fans, compressors, grinding mills and large constant-speed conveyors, you can't beat these new motors for proved dependability and minimum maintenance. Throughout industry, over 1,500,000 motors of Tri-Clad design, totalling over 4,000,000 horsepower, have delivered so far over 5,000,000,000 hours of service!

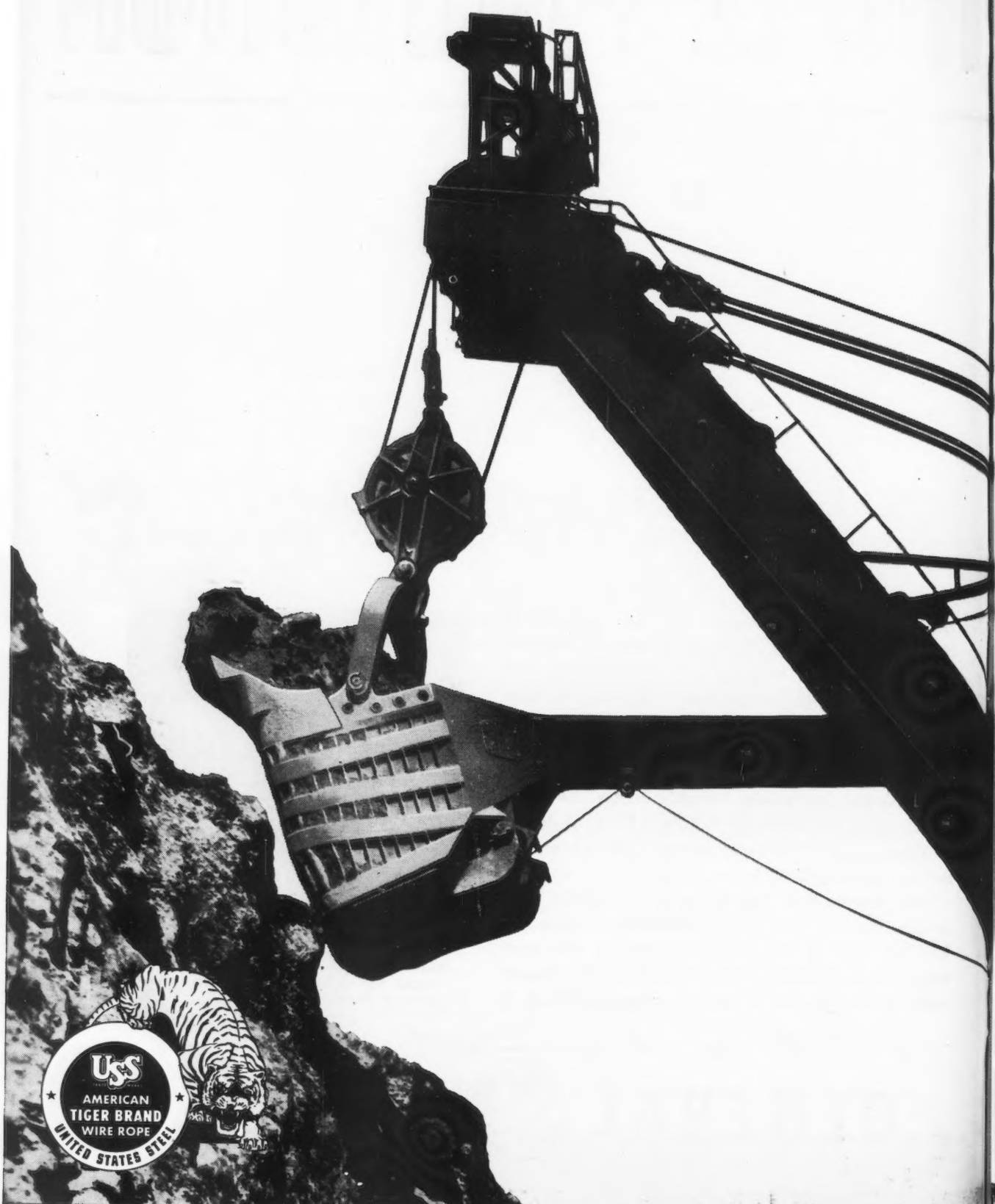
Your nearest G-E representative will gladly show you in detail the cost-cutting advantages of these new Tri-Clad high-speed synchronous motors. For more data, write for Bulletin GEA-5113. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Shown direct coupled to an air compressor, this Tri-Clad high-speed synchronous motor is rated 250 hp at 600 rpm.

GENERAL ELECTRIC

660-18

How the proper application



# of wire rope

-may save you money

● Every user wants to get the best possible service out of his wire rope but it is amazing how often simple rules are broken in the field. Some operators are careless when installing a new rope . . . they keep machines running when sheaves are badly worn . . . they overload the rope . . . they forget to lubricate the rope.

To help eliminate these human failings, the American Steel & Wire Company maintains a staff of TIGER BRAND Wire Rope Specialists. These men are experienced field service engineers. If you have not checked your equipment recently, for correct wire rope application, call in the TIGER BRAND Specialist. He'll do the job for you without charge. Here are some of the points he checks before recommending the proper wire rope for your job—

1. Method of installing and caring for rope.
2. Diameter of sheaves and drums, and condition of grooves.
3. Arrangement of sheaves.
4. Fleet angles.
5. Loads handled.
6. Rope speeds, acceleration and deceleration.
7. Presence of vibration, whipping.
8. Lubrication.
9. Corrosion.
10. Amount of scrubbing and abrasion.
11. Fitting attachments.
12. Abuses to be corrected.
13. Analysis of service records.
14. Finally: Recommendation of the correct rope to meet all conditions.

To show you how you can save money on wire rope, we have prepared a booklet on proper wire rope application that every user of wire rope should read. You can get a copy by mailing the coupon.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

SEND FOR NEW FREE BOOKLET

American Steel & Wire Company
Rockefeller Building, Dept. C-12
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Gentlemen:

Send me your booklet, "Valuable Facts about the use and care of Wire Rope."

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Position.....

Company.....

Address.....

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

It has gone a long way in improving conveyor belt strength

"Cordura" Tenacity Rayon

For high strength at low cost ... look into Cordura*

This man-made fiber is engineered to yield much greater strength than natural fibers. That's why "Cordura" yarn makes possible lighter belts . . . and longer belts.

"Cordura" is the same high tenacity rayon so widely used to improve tires, V-belts and hose. Now you can reap the benefits of lighter conveyor belts that are easier to carry about, install and take down. And for long-lift belts, "Cordura" provides the necessary tensile strength plus remarkable troughability and resilience.

Du Pont "Cordura" High Tenacity Rayon is a basic type of fiber that can be used in conveyor belts, no matter whether they're made of individual cords, cord fabric or woven fabric.

Next time you order a conveyor belt, ask your supplier about "Cordura." While you might expect to pay a premium for the advantages of "Cordura," it's actually your best buy in amount of tensile strength per dollar!

Du Pont will be glad to give you detailed information about "Cordura." Just write Rayon Division, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del. *REG. U. S. PAT. OFF.

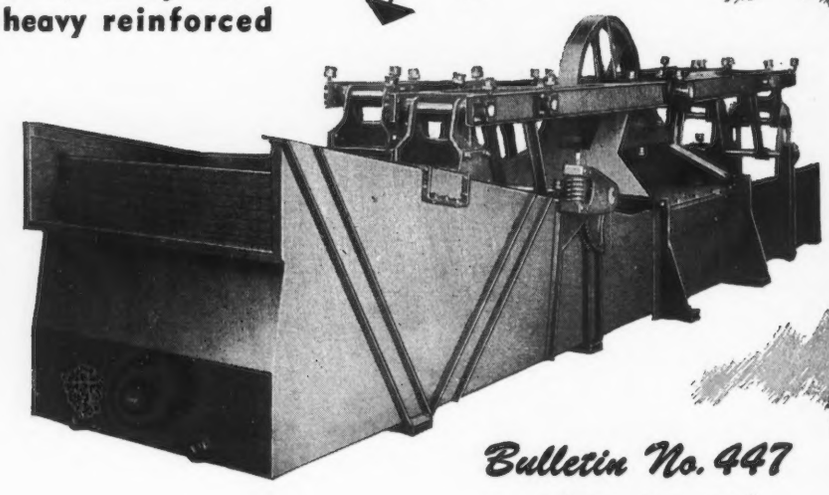
DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

for RAYON . . . for NYLON . . . for FIBERS to come . . . look to DU PONT

Superior Mechanical Performance Plus Metallurgical Efficiency with Morse "TRUELINE" CLASSIFIERS

The uniform "Trueline" stroke improves results, minimizes maintenance and increases sand raking capacity. Built for hard and continuous duty — simple to operate and maintain — smooth performance — large pool area — free from oil and grease drip. Compact drive, sturdy fabricated mechanisms and heavy reinforced steel tanks.



Bulletin No. 447 upon request

MB

MORSE BROS. MACHINERY CO.

ESTABLISHED 1898

P. O. BOX 1708 • DENVER, COLORADO, U. S. A. • CABLE "MORSE"

"TEXROPE Vari-Pitch SPEED CHANGERS Boosted Our Production" — SAYS MILL FOREMAN

"With these clean, compact units, we can change speeds without stopping ...get in-between speeds we need."

FOR GREATER MACHINE OUTPUT in *your* plant, get the same variable speed drive that makes mill foreman Ralph Finkboner of Rochelle, Illinois, so enthusiastic. Texrope Vari-Pitch Speed Changers give you smooth, accurate speed control at the turn of a crank. You operate your machines at *exactly* the right speed for highest production.

V-belt drive cushions Texrope Vari-Pitch Speed Changers against shock loads. Design is simple, compact, smooth running and easy to keep clean. Capacities range from 1 to 75 HP with stepless speeds up to 3.75 to 1.

Texrope Authorized Dealers and Allis-Chalmers District Offices have at their command the greatest V-belt experience in the industry. Consult them and be *sure* of the best drive for your particular need. Listed in SWEET'S. A 2541

ALLIS-CHALMERS, 969A SO. 70 ST.
MILWAUKEE, WIS.

Texrope, Super-7, Texsteel, Texdrive, Magic-Grip and Vari-Pitch are Allis-Chalmers trademarks

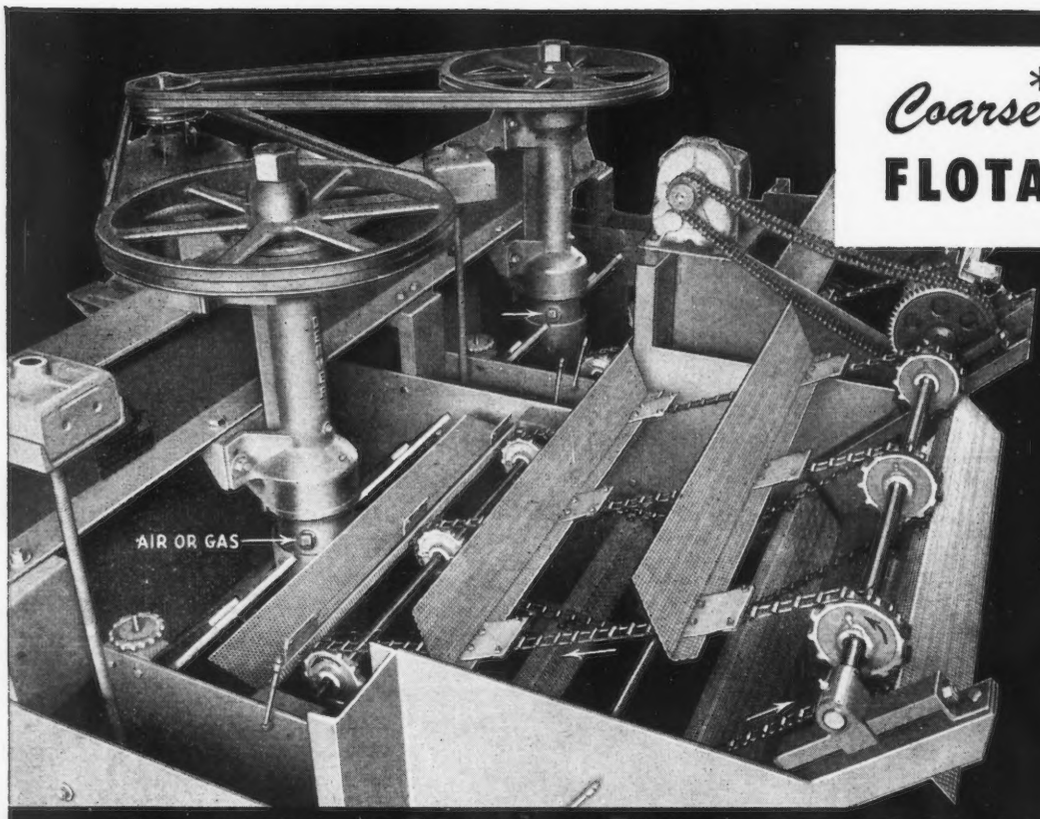
A Complete Range of Products		
Super-7 V-belts	5 types . . . sizes to suit every power transmission job	
Texsteel, Texdrive, Magic-Grip	Sheaves in a full range of sizes and grooves	
Vari-Pitch Sheaves	Exact variations in speed — Stationary or Motion control	
Speed Changers	Speed variations up to 375% at the turn of a crank	

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices.

ALLIS-CHALMERS A-C MILWAUKEE

ALLIS-CHALMERS

Originators of the Multiple V-belt Drive for Industry



*Coarse** COAL FLOTATION

Working directly with the Bureau of Mines Coal Preparation Section, and with large coal companies engaged in solving the problem, Denver Flotation Engineers designed a Flotation Machine which does an effective job of coal cleaning as will be noted in the tabulations below from Bureau of Mines Report of Investigations 4306, July 1948.

Marketable results are obtained on varying types, grades and sizes of coal fractions.

with DENVER "SUB-A" FLOTATION MACHINES

PROBLEM • Treating coal fractions from 1/16"-0. Two objectives are sought—

1) *to save marketable grade of coal in these sizes and*
2) *eliminate stream pollution from wasted slurry water.*

These coal fractions cannot be satisfactorily cleaned by "gravity" methods. With flotation remaining as the most acceptable solution, a prime consideration is that the flotation machine used must be capable of handling both coarse and fine sizes effectively. The rapid rising, dense agglomerate type "matte" coal concentrate must be removed and dewatered in large volume.

SOLUTION • No commercial flotation machine can treat both coarse and fine sizes so effectively as the Denver "Sub-A." This selective feature plus its extreme mechanical and metallurgical flexibility makes it the logical choice for coal cleaning work.

Removal and dewatering of the dense agglomerated "matte" concentrate was accomplished with special "deep-digging" punched plate rakes which carry the 7"-8" coal matte up the spitzkasten allowing surplus water to drain back in the pulp through the perforated rakes. Further dewatering is carried out in a wedge bar compression screw conveyor. Surplus water returns via middling feed pipe to the Denver "Sub-A" Flotation cell for re-use, thus eliminating surplus slurry water.

	SCREEN SIZE, MESH	FEED		CLEANED COAL		REFUSE		DISTRIBUTION, %		Reagents, lbs. per ton feed
		Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Weight, percent	Ash, 1* percent	Cleaned Coal	Refuse	
MINE I *	10 to 14	18.8	11.9	23.0	6.2	9.1	31.6	77.6	22.4	Kerosene, 3.27
	14 to 35	51.4	19.1	56.0	7.6	31.9	65.3	80.1	19.9	B-23 Frother, 0.24
	35 to 100	23.3	40.3	17.0	13.4	35.6	81.8	60.7	39.3	Pine Oil, 0.11
	Through 100	6.5	58.3	4.0	19.3	23.4	84.0	39.7	60.3	
	Composite through 10	100.0	25.2	100.0	8.7	100.0	72.5	74.1	25.9	
MINE II *	10 to 35	64.2	10.5	58.2	3.4	54.0	50.7	85.0	15.0	Kerosene, 3.46
	35 to 100	22.6	10.5	26.9	4.6	22.2	66.2	90.4	9.6	B-23 Frother, 0.26
	Through 100	13.2	12.8	14.9	6.3	23.8	64.8	88.9	11.1	Pine Oil, 0.20
	Composite through 10	100.0	10.8	100.0	4.2	100.0	57.5	87.6	12.4	

1*—Moisture free basis

CONSULT WITH YOUR DENVER "FLOTATION ENGINEERS"

"The firm that makes its friends happier, healthier and wealthier"

DENVER EQUIPMENT COMPANY
P. O. BOX 5268 • DENVER 17, COLORADO

DENVER • NEW YORK CITY • CHICAGO • TORONTO • VANCOUVER • MEXICO CITY • LONDON • JOHANNESBURG • RICHMOND, AUSTRALIA

Central Ohio Coal Company* gets L-O-N-G-E-R service from J&L *Precisionbilt* WIRE ROPE

J&L STEEL

30-month figures prove superior performance of J&L wire rope

For two and one half years, Central Ohio Coal Company of Zanesville, Ohio, has kept detailed records on the performance of wire-rope hoisting lines, draglines and dump cables used in their strip-mining operations. These records prove that, among the several different brands used, J&L Wire Ropes gave *more days of service* and moved *more cubic yards of overburden.*

Here are the average performance figures:

Dragline—50% longer service life than competing wire ropes. (J&L Precisionbilt 2¼" dia. Type "U" Lang Lay)

Hoisting Line—30% longer service life than competing wire ropes. (J&L Precisionbilt 1¾" dia. 6 x 37 Lang Lay)

Dump Cable—More than twice the service life of competing wire ropes of ⅛" larger diameter. (J&L CenterFit 1⅛" dia.)

But it is what's behind these records that counts! Both J&L and Central Ohio "know their ropes." J&L knows how to build wire ropes and what type to recommend for every job. Central Ohio knows how to operate them for the longest and most profitable service. This means not only correct application, but also *proper, engineered care.*

—And what is "proper, engineered care?" Why not let a J&L Wire Rope service engineer tell you? He's a specialist in wire rope application. He knows how to get the most out of every inch of hoisting line, dragline, logging rope, marine cable, oil-country line—or wire rope in any other application.

If you would like to have a J&L engineer call on you, write us. The coupon is for your convenience.

Above—*Page, Model 627 S, Walking Dragline, with 12-1/2 yd. bucket. J&L Wire Rope for hoisting line, dragline and dump cable.*

Jones & Laughlin Steel Corporation
412 Jones & Laughlin Building
Pittsburgh 30, Penna.

Gentlemen:

We are interested in learning how to get more service from our wire ropes. Please have a J&L engineer call on us.

Name.....

Address.....

*Affiliated with Ohio Power Company in the American Gas and Electric System.

JONES & LAUGHLIN STEEL CORPORATION

It Pays to

LOOK BEYOND

"Materials Handling"

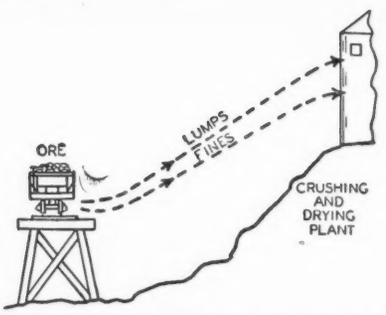
There comes a time when *mechanized bulk materials handling methods,* which once were a big improvement, can be reviewed with very promising opportunities of profit. Today materials handling averages 36% of production cost. Methods do not stand still any more than costs do.

•

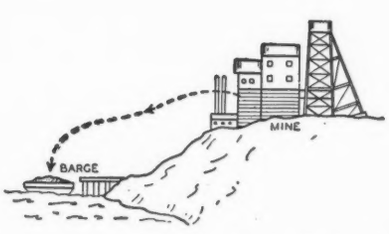
Even comparatively recent installations should be re-examined in terms of today's product requirement, today's costs and today's plant layout.

•

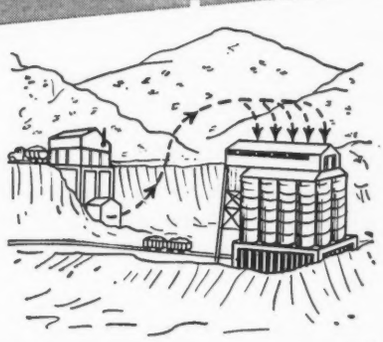
We can help. Stephens-Adamson engineers claim no miraculous formula—only complete familiarity with the problem. An invaluable "know-how" grows up in a staff of men during years of repeatedly finding the "best practical way" under new sets of conditions. Equally important, their recommendations are not influenced by particular types of conveyors, elevators, hoists, etc. which their company "happens" to make. We make all types and can recommend the most suitable for any particular requirement.



Conveying wet ore from dump cars — the lumps to crusher and fines to dryers where crushed lumps rejoin fines.



Carrying ore a considerable distance to barges for economy of waterway transportation.



Crushed copper ore is delivered from crusher to 5000 ton storage bins (live capacity) for shipment by rail.

STEPHENS-ADAMSON MFG. CO.

4 RIDGEWAY AVENUE, AURORA, ILLINOIS — LOS ANGELES, CALIF. • BELLEVILLE, ONT.

Designers and Manufacturers of All Types of

BULK MATERIAL HANDLING EQUIPMENT

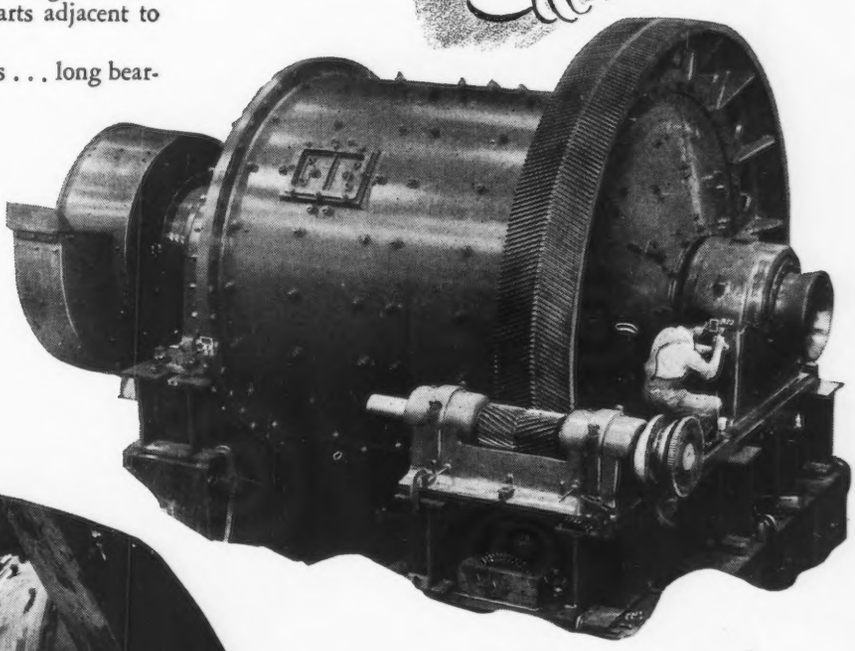
How to Save on Grinding Costs..

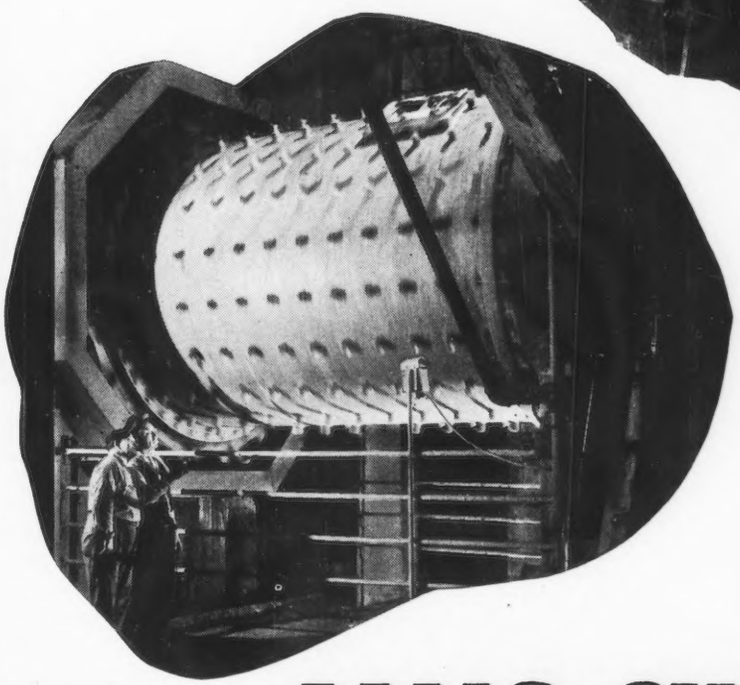
INSIST ON STURDY MILL CONSTRUCTION

You'll find extra-strength features a-plenty in Allis-Chalmers *grinding mills!* All-welded mill shells, for example, are "stress-relieved" in Allis-Chalmers' huge annealing furnaces. That means longer mill life . . . because parts adjacent to welds are relieved of all strain.

Large bearings mean low bearing pressures . . . long bearing life. The use of conical mill heads gives you the highest strength per pound of metal used.

Experience is another advantage you get when you specify Allis-Chalmers. Experience gained in building over 4,000 *grinding mills.* Experience in improving grinding mill design to the point where you'll get minimum maintenance . . . freedom from costly shut-downs . . . efficient operation year after year — from Allis-Chalmers!





AND LOW-COST OPERATION . . .

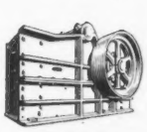
Best grinding economy is possible only when the type and size of your mill is specifically suited to your job. Allis-Chalmers builds *five separate types of grinding mills* . . . in a wide range of sizes . . . available in overflow, diaphragm grate, or any special type with feeders and drives designed to give you top grinding efficiency.

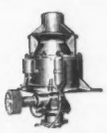
There is an Allis-Chalmers representative near you who will be glad to discuss your grinding problems with you. Call him today. No obligation.

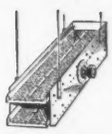
A 2536

ALLIS-CHALMERS, 969A SO. 70 ST.
MILWAUKEE, WIS.

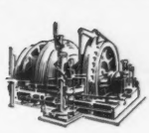
ALLIS-CHALMERS


Jaw Crushers

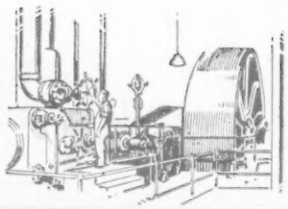

Gyratory Crushers

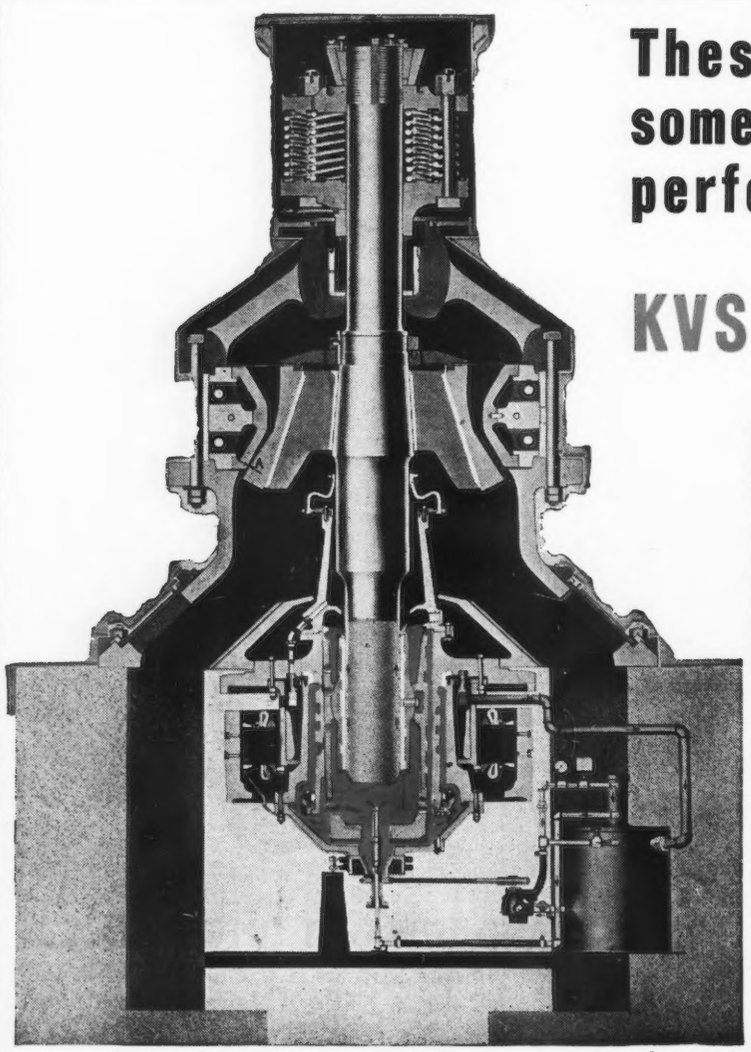

Vibrating Screens

Kilns, Coolers and Dryers


Hoists

. . . and Other Equipment for the Crushing, Cement and Mining Industries

Mr Corliss  had the RIGHT



These figures give you some idea of the mighty performance of

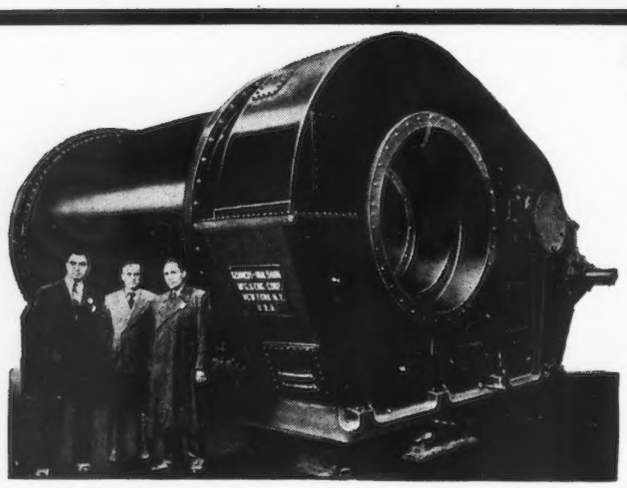
No. 37½ TYPE S

KVS GEARLESS CRUSHER

LOCATION: NATIONALLY KNOWN MINING CO.
NEW YORK STATE
CRUSHERS: FOUR NO. 37½ KENNEDY TYPE "S"
ROLLER BEARING GYRATORY CRUSHERS
FEED OPENING: 6¼"; DIAMETER OF HEAD: 3 FEET
DISCHARGE SETTING: 7/32" CLOSED SIDE AT HEAD
CAPACITY EACH CRUSHER:
56 TONS PER HOUR
HORSEPOWER EACH CRUSHER: 48 HP.
CLOSED CIRCUIT OPERATION
GRADATION AS FOLLOWS:

THE FIGURES!

99.8%	Minus	3	MESH
93.3	"	4	"
80.6	"	6	"
66.6	"	8	"
56.1	"	10	"
48.1	"	14	"
40.6	"	20	"



TWO right ideas cut costs in "KVS" Ball Mills

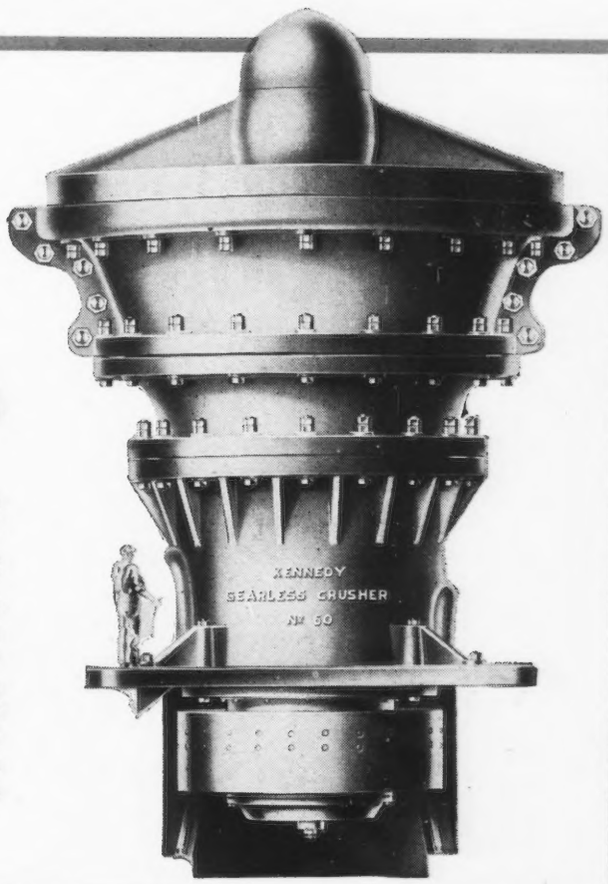
Idea No. 1 — the Kennedy INTEGRAL GEAR DRIVE enables motor to be DIRECT CONNECTED to driving shaft of this KVS Ball Mill. Shaft is carried in roller bearings that CANNOT be misaligned or set wrong. This is a sure safeguard against wasted power.

Idea No. 2—the "KVS" bearings on large sized tube and ball mills are carried on oil so that the bearing never wears out and uses little power. All gears and bearings are automatically sprayed with oil before the tube mill is started (Design patented). In 15 years no gears or pinions have worn out.

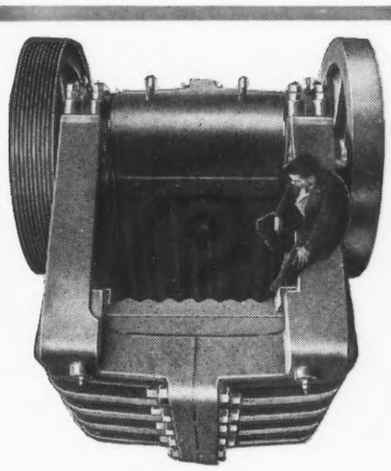
NO WONDER USERS SAY—"KVS PRODUCTS ARE

IDEA - and KVS proves it!

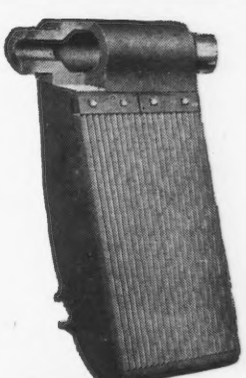
This idea pays off in MORE CRUSHING FOR LESS POWER COST *in this* "KVS" GEARLESS



You'll recall Mr. Corliss' idea—putting a big pulley on his engine. The pulley whirled around, creating KINETIC energy, which got more power from the steam. You see, you get ADDED POWER FOR NO ADDED COST when the big pulley in KVS Gearless Crushers whirls at a speed of 3,500 ft. per minute. What's more, the 8-ton pulley (as used in a KVS Crusher weighing 400,000 lbs.) can be turned WITH TWO FINGERS! That's because there are NO power-eating noisy gears in this KVS. If there was a bevel gear between the eccentric and the pulley, it would take six men with crowbars to turn it. In short, more CRUSHING for LESS POWER COST, is the KVS big idea for efficiency.



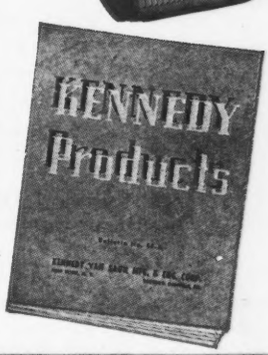
And the KVS "Swing Jaw" also proves a GREAT idea!



The idea is that you get BETTER CRUSHING in the KVS Swing Jaw Crusher—because both jaws "share the load". That's because the angle of both swing jaw and stationary jaw is the same. Stationary jaw carries fully 50% of the load—So you need LESS POWER to keep the swing jaw swinging and crushing. Another KVS idea is the swing jaw is all one piece, except renewable crushing plate. Also swing and stationary jaws are interchangeable, both the same length.

Kennedy-Van Saun
MANUFACTURING AND ENGINEERING CORPORATION
2 PARK AVE., NEW YORK 16, N. Y.
FACTORIES:
DANVILLE, PA., U.S.A.
CANADA, ENGLAND, FRANCE, AUSTRALIA

WRITE
For this "KVS" Bulletin. It gives complete technical data on "KVS" CRUSHERS — the facts you want before you invest good money.



THE PRODUCTS WITH THE TROUBLE LEFT OUT

Any V-BELT Changes Shape *when it Bends*

Prove this yourself!

That's Why the CONCAVE SIDE...

(U. S. PATENT NO. 1813698)

Gives You 2 Big SAVINGS!

REG. U. S. PAT. OFF.

The Mark of SPECIALIZED Research

Bend *any* V-Belt and *f e e l* it change shape. The top, under tension, *narrows*. The body, under compression, *widens*. The sides of the belt bulge out.

Straight-Sided V-Belt

Straight-Sided V-Belt Bulges in Sheave-Groove.

The result, if the belt is built with *straight* sides, is a shape that does not fit the sheave groove — as shown in Figures 1 and 1-A, above.

Now, bend the V-Belt built with the precisely engineered Concave Side (U. S. Patent No. 1813698) — the Gates Vulco Rope.

Gates Vulco Rope With Concave Side.

No Side Bulge. Precise Fit in Sheave Groove.

You get the same shape change but *now* the new shape *exactly fits* the sheave groove as shown in Figures 2 and 2-A.

Results— (1) *Uniform* side-wall wear; *longer* life. (2) *Full* side-wall grip on the pulley; carries heavier loads and sudden load increases without slippage—a big increase in drive efficiency—saving belt wear a n d also saving power!

The Concave Side is MORE IMPORTANT NOW Than Ever Before

Because the *sides* of a V-Belt are what actually *drive* the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley *directly* through the belt's side-walls.

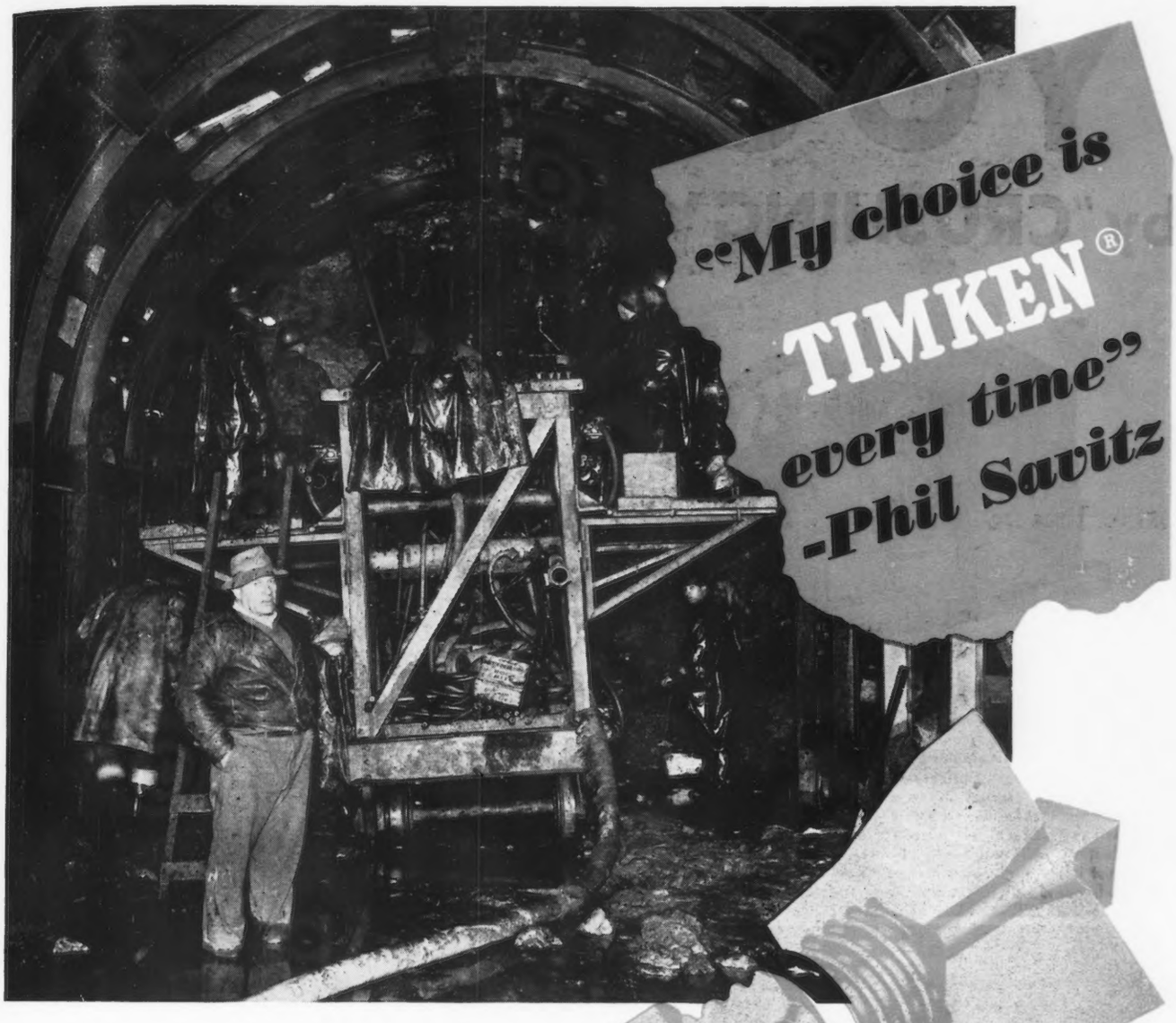
Now that Gates *SPECIALIZED* Research has m a d e available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side naturally delivers greater savings today than ever before.

4812

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.
"The World's Largest Makers of V-Belts"



Phil Savitz is the superintendent on the storm water tunnel job being driven for the city of Philadelphia by Robert Lombardi, general contractor. Mr. Savitz's full statement follows: "I have been on tunnel and other rock jobs in nearly every section of the United States and have used all types of bits. My choice is Timken every time."

When completed the Philadelphia water tunnel will be 1,800 feet long, 16 feet high and 13½ feet wide. It is being drilled through mica schist and quartz rock. Timken Rock Bits are used exclusively on the job.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

Drilling is done with jumbo rigs, each mounting six, 3½ inch piston drills operating at 90 pounds of air pressure. A "drill-up" of approximately 56 holes is accomplished in 40 minutes average time.

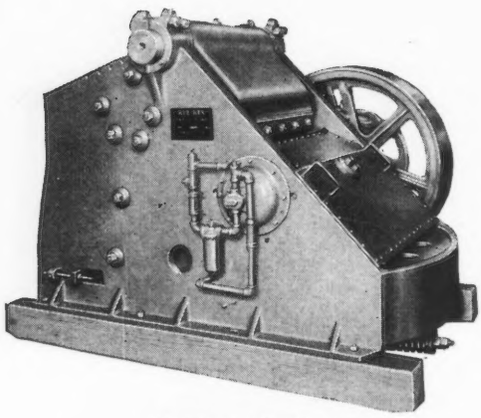
Commenting on the use of Timken Bits, Mr. T. E. Laws, general superintendent for Robert Lombardi writes: "Our past experience with your bits and the over-all economy obtained through their use were the governing factors in our decision to use them on this job. They have again proved their efficiency and economy. The drilling speed obtained through the use of Timken Rock Bits enables us to get a maximum number of 'drill-ups' per day and we expect to complete the job well ahead of schedule."

There's a Timken Rock Bit distributor at the other end of your telephone. Write for his name and address.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO • CABLE ADDRESS "TIMROSCO"

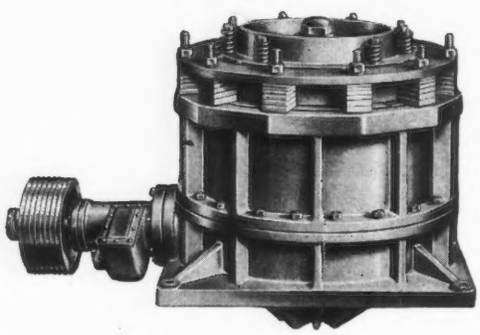
YOU SAVE

by "CRUSHING WITHOUT RUBBING"



KUE-KEN SIMPLEX

Pictured is No. 80 36" x 10" Simplex, showing oil pump and filter side. Perfect lubrication of all mechanism in oil-tight housing stops wear, requires attention only twice a year. Automatic features give complete protection against lubrication failure and overloading. This model crushes 50 to 60 tons per hour with 1" setting, uses exclusive Kue-Ken principle of "crushing without rubbing." A miser for power, a giant for production. All-steel frame is three times stronger than cast iron, weighs only half as much. Can be choke-fed —flood it with rocks and keep it full. Other models from 12" x 7" to 42" x 25".



KUE-KEN GYRATORY

Operates on the long-proved Kue-Ken principle of "crushing without rubbing." Powerful, compact, yet with larger, stronger shafts—7" diam. in 18-inch crusher, 12" diam. in 3-ft. model—provides greater bearing area for cool running, longer life.

LOW HEADROOM—18-inch crusher only 30¼" high, 3-ft. crusher 45" high. TAKES CHOKE FEED of hardest rock—no feeders required.

Greater Capacity with Less Power

"Crushing without rubbing" is an exclusive Kue-Ken* principle that slashes crushing costs. Two types of Kue-Ken Crushers handle all hard crushing jobs:

1. *Kue-Ken Simplex Jaw Crusher in 17 sizes, from 12 x 7 to 42 x 25.*
2. *Kue-Ken Gyratory for fine reduction crushing down to the smallest, in 18-inch and 3-ft. sizes.*

Both the Simplex and the Gyratory "crush without rubbing." Mechanism operates in a sealed and filtered oil bath—for perfect lubrication, minimum wear and lowest upkeep cost.

"Crushing without rubbing" gives 5 to 10 times longer jaw plate life and less metal contamination of product, very important to some industries. This principle of crushing usually gives 2 to 3 times greater capacity with far less power.

Take the first step to reduce your crushing costs—send for Kue-Ken bulletins today.

Kue-Ken Simplex Jaw Crusher—Bulletin No. 605
Kue-Ken Gyratory Crusher—Bulletin No. 604

*Pronounced Q-Ken. U. S. & Foreign patents pending.

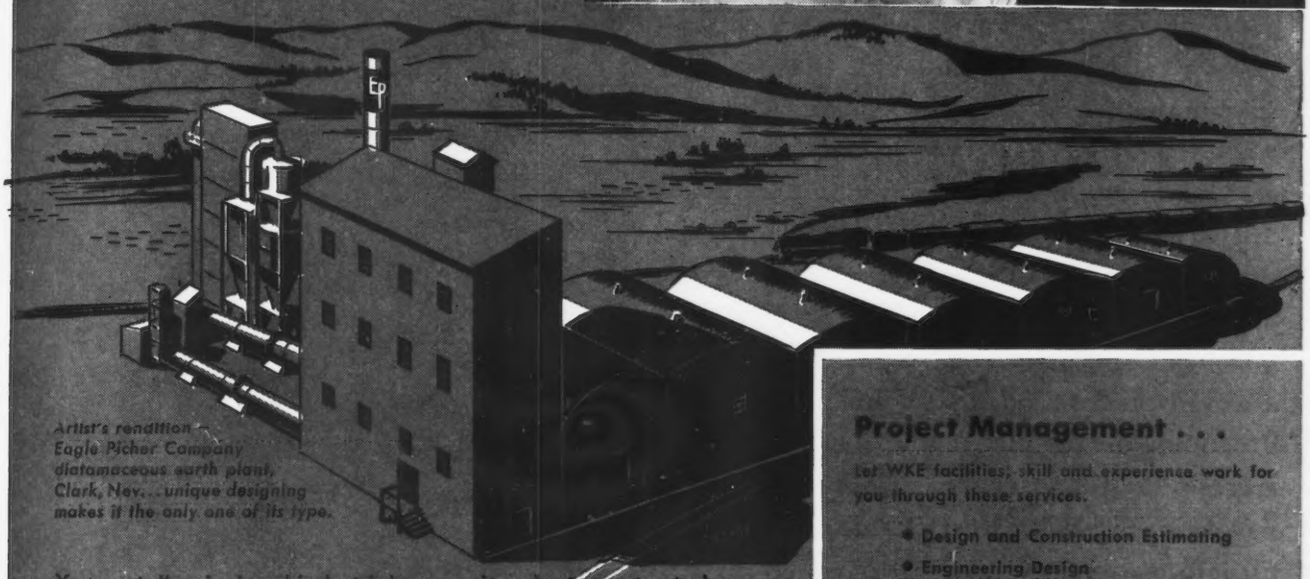
STRAUB MFG. CO.

521 CHESTNUT STREET **OAKLAND 7, CALIFORNIA**

Kue-Ken Balanced Crushers	Rib Cone Ball Mills	Overflow Classifiers
Kue-Ken Simplex Crushers	Concentrating Tables	Feeders
Kue-Ken Gyratory Crushers	Overhead Eccentric Crushers	Screenwheel Classifiers

Another W.K.E. Service

Plant Construction



Artist's rendition — Eagle Picher Company diatomaceous earth plant, Clark, Nev. . . unique designing makes it the only one of its type.

Your metallurgical and industrial processing plant constructed by WKE has a guarantee of performance according to specifications of the design. Your assurance of performance is based on WKE abilities demonstrated in the building of successful plants all over America.

All WKE construction personnel perform as a smooth team with a coordination that comes from many years of working together and sharing the rich background of WKE construction experience. Superintendents are experts in unit costs. Purchasing agents and accountants possess a complete working knowledge of equipment prices. The skills and experience of these men are combined to erect your plant quickly and economically.

At the completion of your project, all costs, purchase orders and drawings are filed as a permanent central record of the elements of your plant. The WKE plant construction "family" offers you a service that guarantees excellence and speed of construction; economies of cost and a sound basis for economical performance of your plant.

Project Management . . .

Let WKE facilities, skill and experience work for you through these services:

- Design and Construction Estimating
- Engineering Design
- Plant Construction
- Equipment and Material Selection and Procurement
- Machine Installations
- Plant Valuations and Accounting
- Mine Development and Management

W.K.E.

WESTERN KNAPP ENGINEERING CO.
DIVISION OF WESTERN MACHINERY COMPANY
760 FOLSOM STREET · SAN FRANCISCO 7, CALIF.

LOS ANGELES · SACRAMENTO · SALT LAKE CITY · SPOKANE · POCATELLO, IDA. · DENVER · PHOENIX · CHICAGO · HIBBING · BARTOW, FLA. · NEW YORK

STURTEVANT

Rotary Fine Crushers

Provide Granular Products Without Excessive Dust

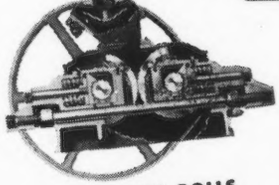
These fast, highly efficient crushers are designed to crush or granulate soft and moderately hard substances to fine even sizes without large amount of dust. They effectively handle materials up to and including the hardness of the softer limestone or cement clinker. The fineness of product is regulated by a hand-wheel. They produce a dependable quality of output from one inch to a quarter inch. Capacity ranges are available from one to 30 tons per hour depending on size of machine. Open door accessibility allows entire crushing area to be exposed for quick, easy cleaning. Write for information.

JAW CRUSHERS

for coarse, intermediate and fine reduction of hard or soft substances. Heavy or light duty. Cam and Roller action. Special crushers for Ferro-alloys. Several types, many sizes.

RING-ROLL MILLS

for medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. No scrapers, plows, pushers, or shields.



CRUSHING ROLLS

for granulation, coarse or fine, hard or soft materials. Precision and automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8x5 to 38x20. Roller or Plain bearings. The standard for abrasives.

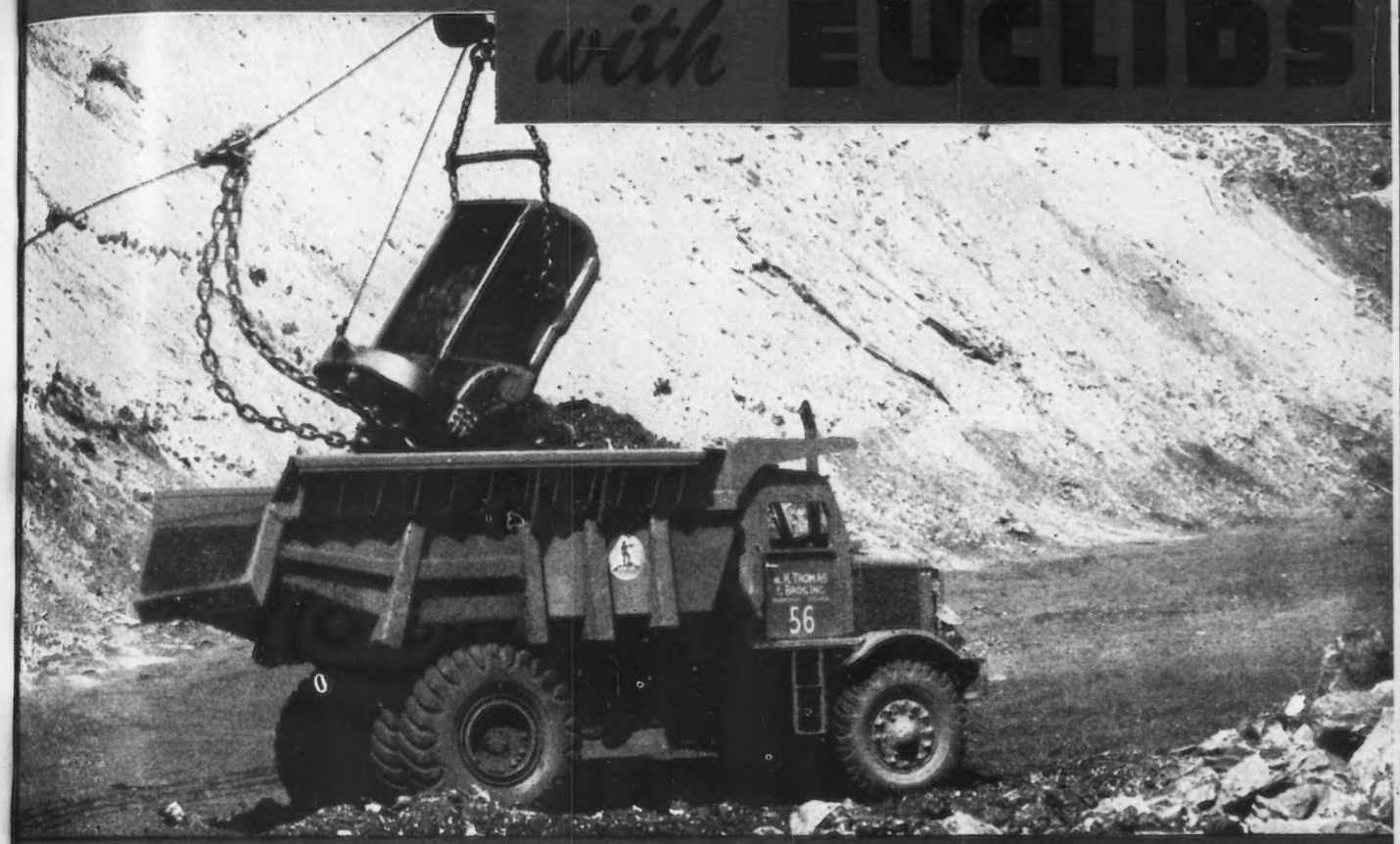
STURTEVANT MILL COMPANY

101 Clayton Street, Boston 22, Mass.

Designers and Manufacturers of

CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • ELEVATORS • LABORATORY EQUIPMENT • MECHANICAL DENS AND EXCAVATORS • MIXERS

You Get "Plus Performance" with EUCLIDS



(Above) Model TD Rear-Dump Euclid. 22 ton capacity . . . 14.8 cu. yds. struck measure . . . loaded top speed 31.2 m.p.h. . . . powered by 225 or 275 h.p. diesel engine.

(Below) Double-acting twin hoists and entire hydraulic system are of Euclid design and manufacture. Action is fast and positive enabling operator to control body position at all times.

REAR-DUMP EUCLIDS are engineered and built for lasting strength. Their ability to stay on the job, day after day, means more tons moved at lower cost . . . "plus" performance for owners.

Model TD Euclid body has extra thick plates reinforced with heavy box section side and bottom supports. The rugged frame is built to stand the jolts of hauling 22-ton loads. That's why it can take the pounding and wear of loading ore, coal, overburden, and heavy excavation by large shovels and draglines.

Some other "plus" features that make the Model TD Euclid unequalled for long-life and continuous performance are large capacity . . . ample power and traction for steep grades and tough roads . . . good speed on the haul road and full-floating, double reduction planetary type Euclid axle.

If you want economical operation and equipment best suited to your hauling needs, see your Euclid distributor or representative.

The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio

EUCLIDS *Move the Earth*

LESS PARTS TO WEAR —

LESS WEAR ON PARTS

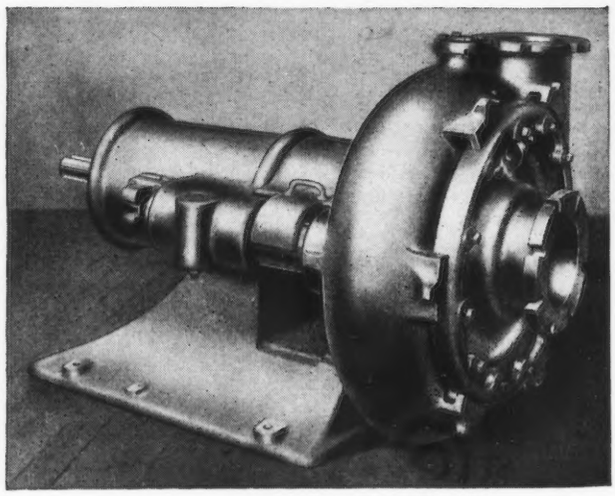
AMSCO-NAGLE PUMPS

CUT COSTS HANDLING ABRASIVE SLURRIES

Only three Amsco-Nagle Pump parts are subjected to the brutal punishing of various slimes, sludges, slurries, and tailings handled in every type of mine. *That's less parts to wear!* The anti-friction bearings are completely sealed off from the water end.

The three parts—end plate, impeller, and casing—are made of Amsco Manganese Steel. *That's less wear on parts!* "The toughest steel known" takes the roughest battering without fracturing . . . polishes and workhardens to as high as 550 Brinell to fight abrasion. (For scouring abrasion without shock stress, Brake Shoe's ABK Metal has proved highly economical.)

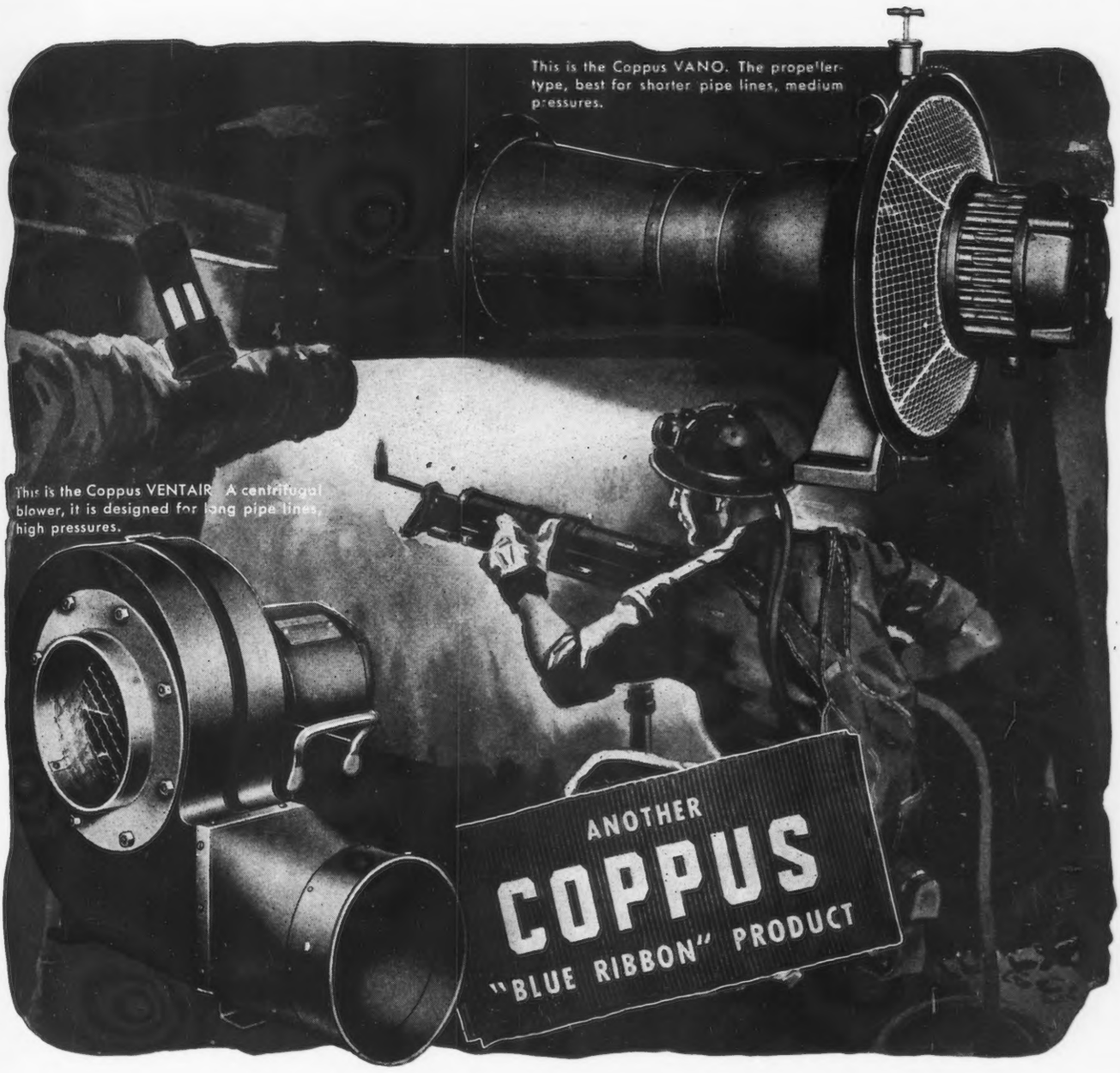
When repairs and adjustments are eventually necessary, they're easier, less costly, less time consuming. The assembled view at right shows how parts are simplified and accessible for easy maintenance. End plate attaches with clamping ring or dogs. Impeller screws on. Supporting tubes on water end slip into sleeves on bearing housing for positive alignment. Stuffing box is quickly reached, from above or below, between supporting tubes. Send for Bulletin 547-IP.



AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo.
Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.


This is the Coppus VANO. The propeller-type, best for shorter pipe lines, medium pressures.
This is the Coppus VENTAIR. A centrifugal blower, it is designed for long pipe lines, high pressures.
ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

When you buy air... one of these two blowers will give you much more for your money

When buying mine ventilation equipment, you're buying *air*, so the question to ask is: "How much air can I get from a definite amount of power?" The answer is: "30% to 100% more by using Coppus VENTAIR or VANO Blower."

Both Coppus types are designed expressly for mine service and give the same high performance under different conditions. Coppus VENTAIR is a centrifugal blower for high pressures, long pipe lines. Coppus VANO is a propeller-type, for medium pressures and shorter lines. Using the right type for your conditions you can get more air from a Coppus blower than from any ordinary all-purpose fan.

Both can be used as exhausters . . . electric motor or compressed air driven . . . in capacities up to 90,000 cfm. *Only Coppus makes both types* — and only Coppus products bear the "Blue Ribbon" that is your assurance of unfailing dependability.

COPPUS ENGINEERING CORPORATION
292 Park Avenue, Worcester 2, Mass.

Please send..... Bulletin 130

Name.....

Company.....

Address.....

HEAVY-DUTY

KOEHRING HEAVY-DUTY SHOVELS CAN CUT YOUR EXCAVATING COSTS

Here is a profitable way to cut your stripping and materials handling costs all around. Match high-speed Dumptor-hauling with dependable, heavy-duty Koehring excavators. It's a big production team, built to work together. Dumptor's heavy-duty construction, easy-loading design, fast hauling and dumping, match Koehring excavator's rugged digging ability and fast-operating speeds . . . give you matched speed and strength to keep output high, costs low. For complete facts on the big 1½-yard 605 (illustrated) . . . ¾-yard 304, or ½-yard 205 excavators, see your Koehring distributor . . . or write for bulletin.

for *heavy hauling...*

DUMPTOR BODIES BUILT FOR HEAVY ROCK SERVICE

To meet the toughest hauling conditions of mine, quarry and construction service, Koehring Dumptors have a ton of strength for every ton of payload. Heavy-duty bodies stand up under the severest shocks of loading rock from big mine and quarry shovels. All-welded sides, ends and bottom are heavily ribbed with 4" channels. High-carbon steel gives extra strength at stress points where abrasive rock action is most severe. Three-layer bottom of seasoned 1-⅝" oak between two 5/16" steel plates cushions shocks.

HEAVY-DUTY CHASSIS TAKES ROUGH HAUL ROAD SHOCKS

Rugged, 8" ship-channel main frame... 4" chrome steel drive axles . . . and cast alloy-steel "I" beam steering axle, add extra strength to Dumptor chassis. Big tires absorb road shocks. There are no leaf springs . . . only one big-double-coil spring on oscillating steering axle. That means no spring shackles to lubricate . . . no spring maintenance. And . . . you have 6 HP for every ton of gross vehicle weight for faster acceleration, less shifting, more grade-ability. Dumptors climb grades up to 24% with full load.

NO BODY HOIST MAINTENANCE WITH GRAVITY DUMP

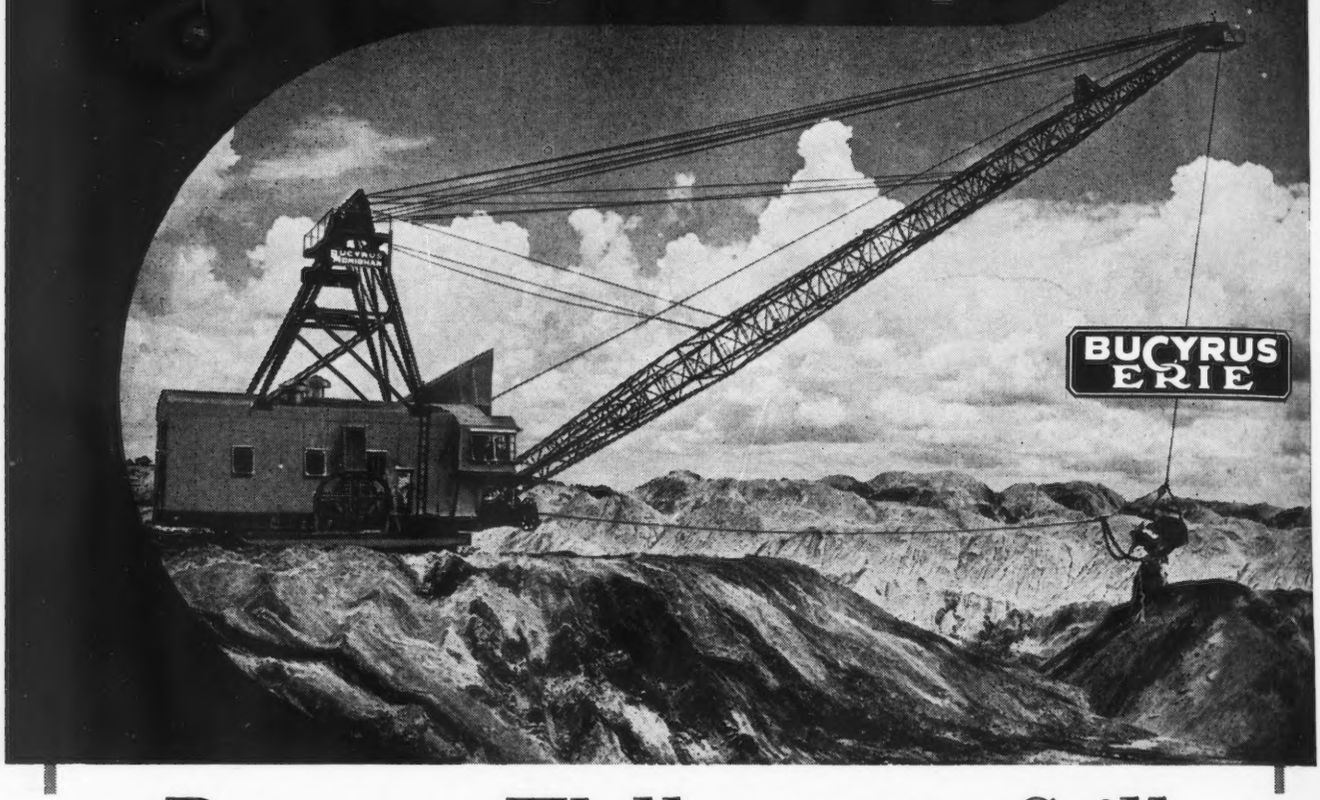
You don't lose time or spend money on body-hoist maintenance because Dumptors have no troublesome body hoists. Gravity dumps the full 6-yard load in one second. Free swinging, kick-out pan breaks suction, keeps dumping fast even in stickiest materials . . . adds an extra 3/16" steel to Dumptor bottom. Heavy-duty construction like this is your assurance that Koehring Dumptors will profitably stand up to your heaviest off-the-highway hauling assignments. Let your nearest Koehring distributor show you how.

KOEHRING COMPANY, Milwaukee 10, Wisconsin

Subsidiaries: PARSONS • JOHNSON • KWIK-MIX

Dumptor—Trademark Reg. U.S. Pat. Off. K809

When Other Machines Have gone to scrap...



Bucyrus Walkers are Still Moving Dirt

Field performance records have proved that Bucyrus-Erie walking draglines are good for years and years of big output — that they have the strength in every part to endure in spite of a steady diet of tough digging.

Their "years ahead" digging speed and smoothness lasts because the strong machinery has the simplicity that keeps maintenance requirements low and digging efficiency high. The absence of complicated gadgets means less trouble and longer life because there is so little that can go wrong.

The walking mechanism lasts, too, because its smooth-working rolling cam action evenly "cushions down" the machine's weight with each step, over rough ground or soft, without the bumps or jars that cause destructive stresses. Bucyrus-Eries step out safely, positively, and gently even after many years of steady use.

BOOMS: 110 to 250 ft.
BUCKETS: 4 cu. yd. to 25 cu. yd.

21M47

Bucyrus-Erie Co.
SOUTH MILWAUKEE, WISCONSIN

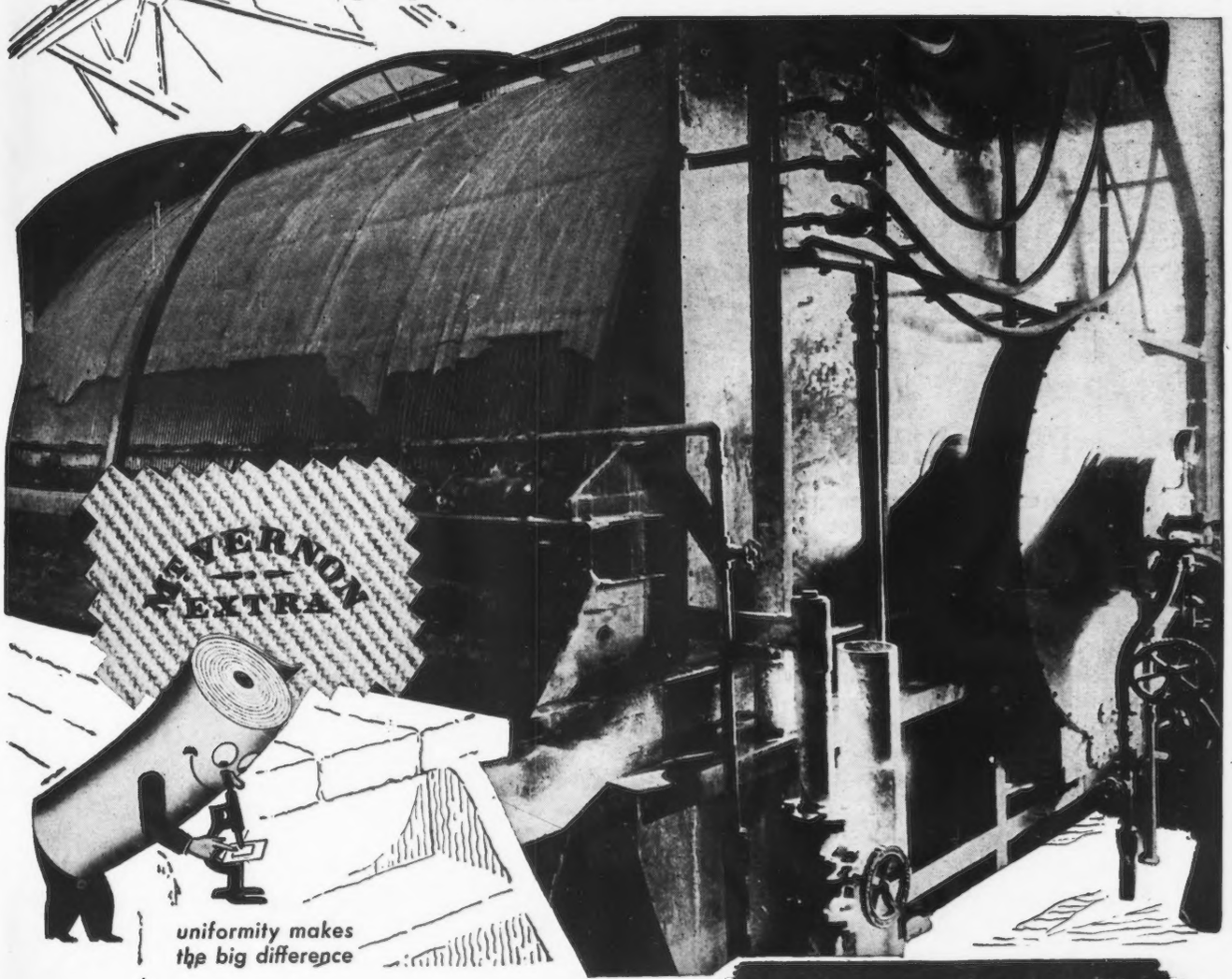
Uniformly Better Filtering with Mt. Vernon Extra

Mt. Vernon Extra filter fabrics are made from top grades of cotton and produced under rigid laboratory controls . . .

The result is Mt. Vernon Extra's high degree of uniformity—for more thorough filtering—greater clarification of filtrates—more efficient recovery of solids . . .

Mt. Vernon Extra has the ruggedness required to take the rough scrubbing and scraping that's necessary in filter-fabric cleaning . . .

For fabrics that give you more thorough, more efficient filtering and longer wear, specify Mt. Vernon Extra.



Mt. Vernon-Woodberry Mills

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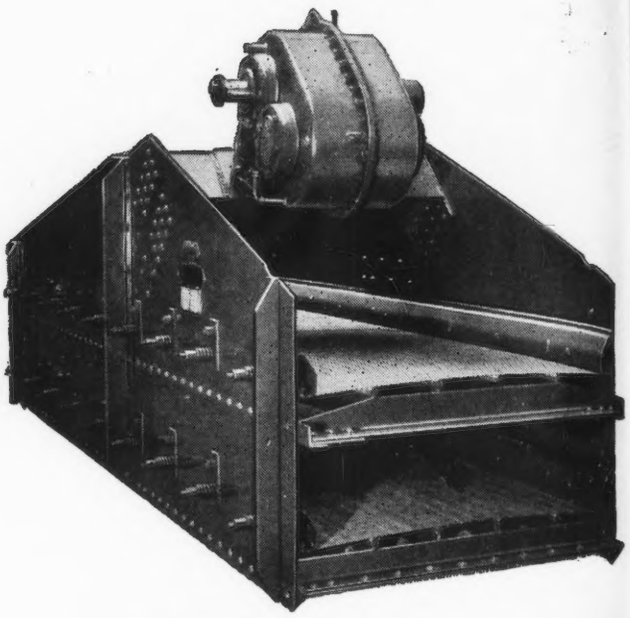
Measure Screen Value These 2 Ways...

CONSTRUCTION

Look at construction first — it has a lot to do with low maintenance and long screen life! Allis-Chalmers builds *Low-Head* vibrating screens of long-lasting high tensile strength steel alloys. All welded parts are "stress-relieved," eliminating local stresses caused by welding. Vibrating mechanism is independently and conveniently located on top of screen — out of the way. Its gears and bearings operate in oil-and-dust-tight steel housing.

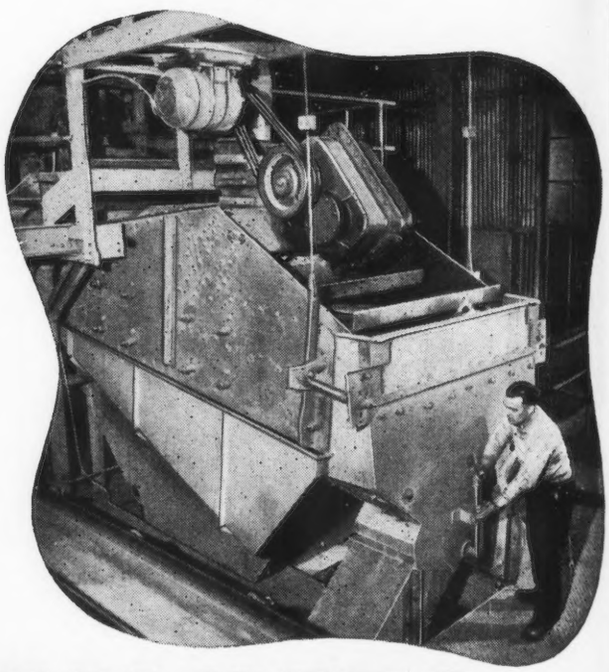
Another important feature of the *Low-Head* screen is the cloth support frame designed to tension screen cloth properly. An increased number of supports and correct crown for different surfaces results in longer screen cloth life!



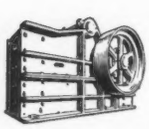
PERFORMANCE

How it works is an equally important measure of screen value. The compact *Low-Head* vibrating screen operates horizontally — saves valuable headroom and space. It can be used for either wet or dry screening... for dewatering ... or as medium drain and wash screens in heavy density separations.

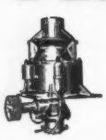
Straight-line motion at 45° to the horizontal results in rapid stratification of feed and a definite conveying action of the material. *Low-Head* screen sizes are from 26 in. x 8 ft to 6 x 16 ft; one, two or three decks. Write for Bulletin 07B6330A. ALLIS-CHALMERS, MILWAUKEE 1, WIS. *Low-Head* is an Allis-Chalmers trademark. A 2517



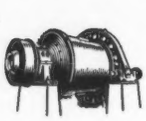
ALLIS-CHALMERS



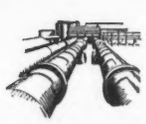
Jaw Crushers



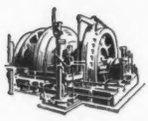
Gyratory Crushers



Mills

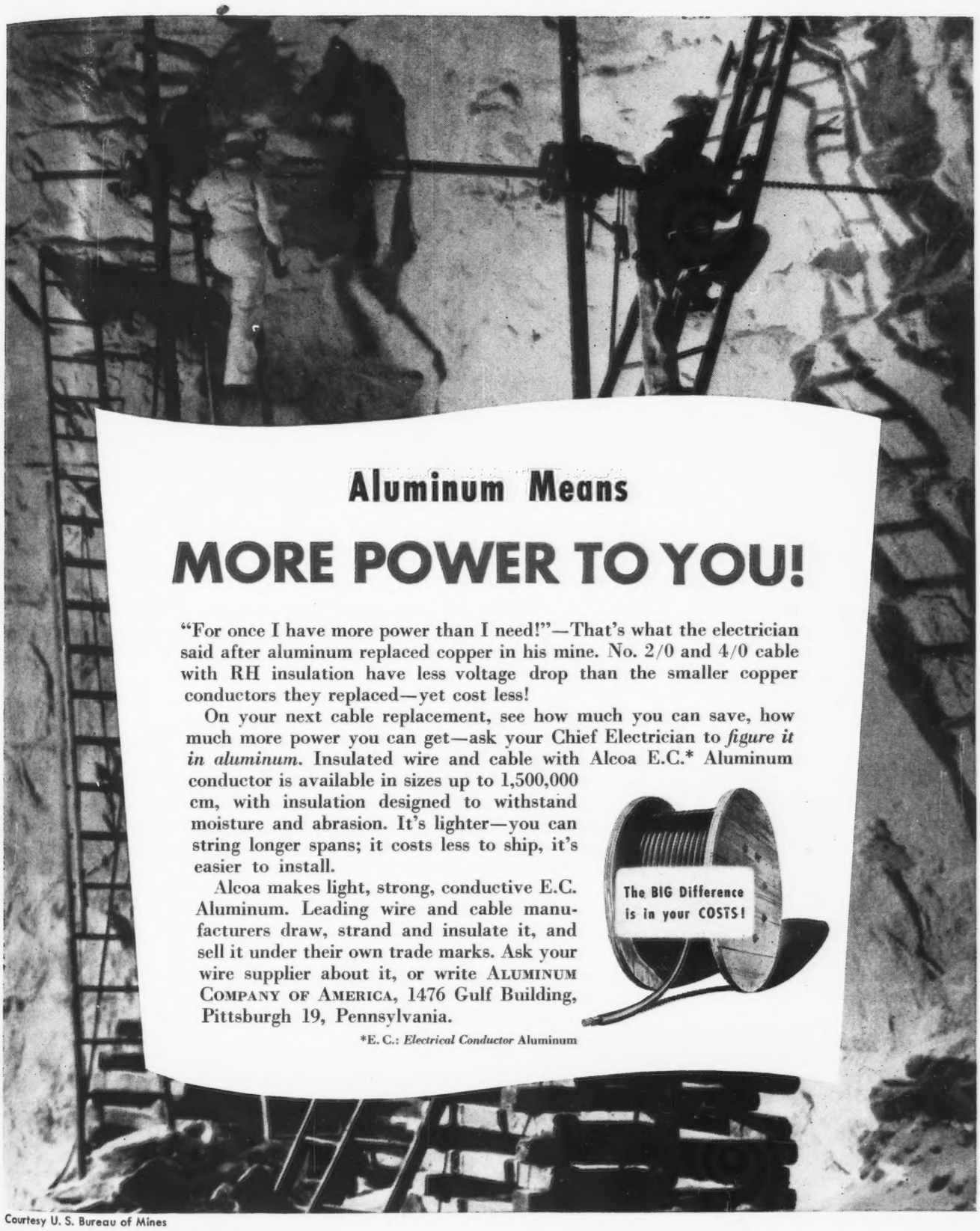


Kilns, Coolers and Dryers



Hoists

... and Other Equipment for the Crushing, Cement and Mining Industries



Aluminum Means

MORE POWER TO YOU!

"For once I have more power than I need!"—That's what the electrician said after aluminum replaced copper in his mine. No. 2/0 and 4/0 cable with RH insulation have less voltage drop than the smaller copper conductors they replaced—yet cost less!

On your next cable replacement, see how much you can save, how much more power you can get—ask your Chief Electrician to *figure it in aluminum.* Insulated wire and cable with Alcoa E.C.* Aluminum conductor is available in sizes up to 1,500,000 cm, with insulation designed to withstand moisture and abrasion. It's lighter—you can string longer spans; it costs less to ship, it's easier to install.

Alcoa makes light, strong, conductive E.C. Aluminum. Leading wire and cable manufacturers draw, strand and insulate it, and sell it under their own trade marks. Ask your wire supplier about it, or write ALUMINUM COMPANY OF AMERICA, 1476 Gulf Building, Pittsburgh 19, Pennsylvania.

*E. C.: *Electrical Conductor* Aluminum

Courtesy U. S. Bureau of Mines

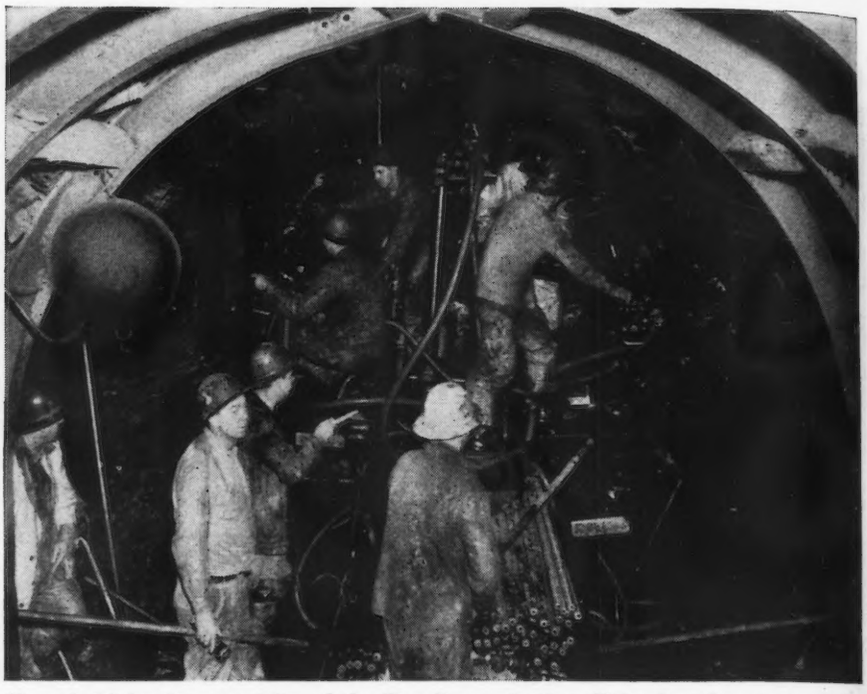
ALCOA EC ALUMINUM

ALCOA ALUMINUM ®

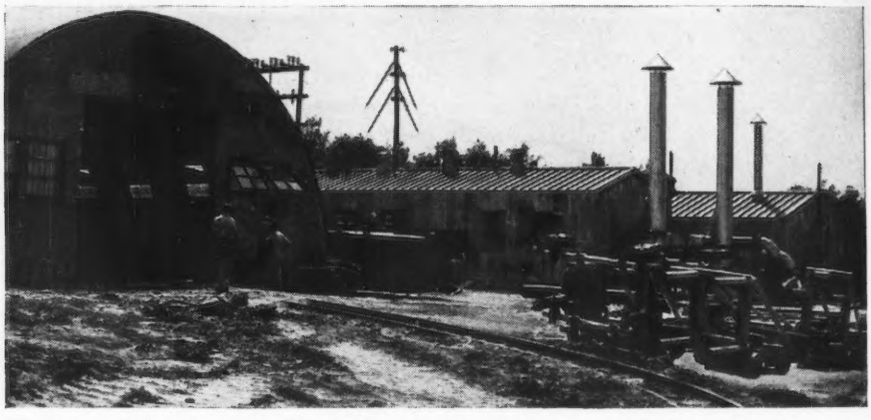
FOR ELECTRIC WIRE AND CABLE

7-mile tunnel holed through

as Baltimore expands Water Supply



Tunnel driving is a specialty of the Rosoff organization. This view shows one of the jumbos in action, mounting five 3½-in. drifters. Using Bethlehem Hollow Drill Steel exclusively, the contractor employed forged bits to drill the relatively hard formations.



Buildings at the site of the Druid Park Shaft include the central blacksmith shop, compressor house, and change house. Note the jumbos in right foreground.

The excavation of the Liberty Road-Montebello Tunnel has just been completed by Samuel R. Rosoff, Ltd., for the Bureau of Water Supply, of the city of Baltimore. The 10-mile Patapsco-Liberty Road Tunnel is the next big job. Due for completion in 1951, this project has also been awarded to Rosoff.

It's all a part of Baltimore's Patapsco Development, involving the construction of 17 miles of water tunnel, which will increase Baltimore's water supply to the tune of 50 million gallons each day.

Beginning work on the first underground bore in October, 1947, the contractor a few months later was operating from six headings, utilizing four shafts previously sunk. With jumbos mounting five drifters each, the average drill round consisted of from 29 to 32 holes, 7 to 9 ft deep. The diameter excavated ranged from 9 ft, 4 in. to 11 ft. Holing through occurred on September 10, 1948, between the Stoney Run and Montebello shafts, the last section of the tunnel to be driven.

Using Bethlehem Hollow Drill Steel exclusively, the contractor forged his own bits in the central blacksmith shop at the Druid shaft. Here all steel was sharpened in three daily shifts and issued to the various tunnel headings. Drill steel was employed in 2-ft changes, beginning with 3-ft starters, the bit gauge being reduced ⅛-in. with each increase in length.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM HOLLOW DRILL STEEL

THE BEGINNING OF A LASTING FRIENDSHIP

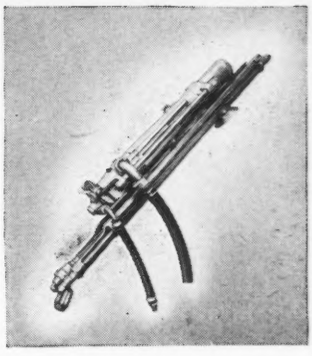
Nothing makes a bigger hit with runners than equipment that combines easier handling with fast, positive action. Make sure they get it — and they'll cut costs for you on every shift!

Take this new Blue Brute Stoper, for example — the self-rotating WR-31. Note how the holding handle is placed *above* the center of gravity, for better balance. Then, there's the shielded, down-directed exhaust . . . and the constant air stream that keeps sludge and water out of the shielded chuck . . . additional features that get a runner's enthusiastic OK!

Built throughout for continuous heavy duty, the WR-31 is packed with design improvements. Like the ratcheted rifle bar's engagement of four air-operated pawls on the piston's backstroke . . . a typical Worthington "exclusive" for fast, trouble-free drilling.

Let an on-the-job demonstration prove to you that *there's more worth in a Blue Brute.* Get your runners' verdict on the WR-31's ease of handling... and see for yourself how much cleaner and faster they can cut away footage.

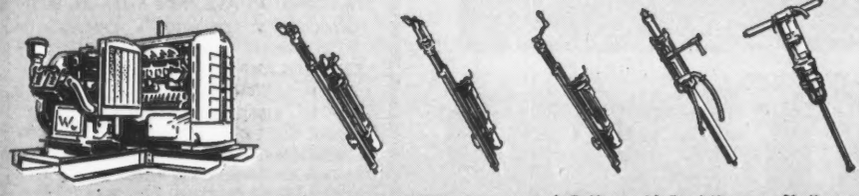
Write for literature describing the complete line of BLUE BRUTE Mining Equipment, including Drifters, Stopers and Hand-Held Drills. H8.19



BLUE BRUTE DRIFTERS

Types WPM (Pneu-Motor incorporated in Drifter), WPMS (Pneu-Motor on Shell), and WHC (Hand Crank). Featuring the new, *balanced* design for faster drilling cycles and all-around operating economy.

BUY BLUE BRUTES



Semi-Portable Compressors. Drifters with Feed Motor Incorporated. Drifters with Feed Motor on Shell. Hand-Crank Drifters. Stopers. Hand-Held Rock Drills.

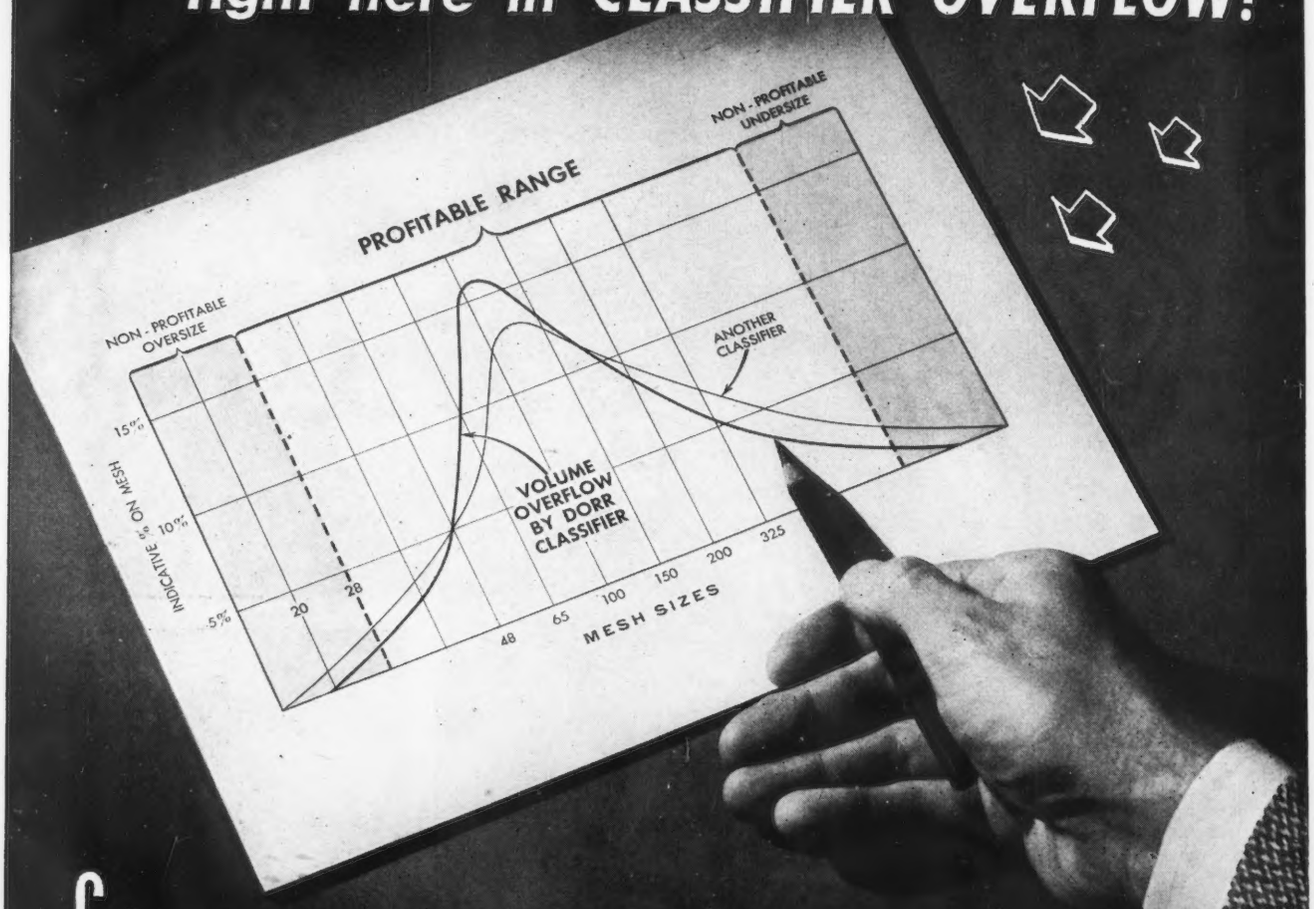
WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

Distributors in all principal cities

You make or break profit...

right here in CLASSIFIER OVERFLOW!



Concentration of the maximum amount of overflow into the *profitable size range* is the key to effective classification . . . and to *metallurgical profits!* You can't afford to have tough-to-float fine or coarse fringe products in your classifier overflow.

Because of effective agitation and dilution in the pool, Dorr Classifiers concentrate more ore particles in the profitable size range than any other mechanical classifier. Pulsations in the pulp pool allow operation at minimum densities. This prevents oversize from escaping in the overflow and undersize from returning with the sands for overgrinding.

The operating data from which the graph above was drawn represents results from but one of the many instances where test runs have proven Dorr Classifier superiority. For further factual information on Dorr Classifier performance relative to your profits . . . write for your copy of "Why Buy Dorr", a reprint of four fact-packed advertisements currently appearing in the technical press.

DORRCO

THE DORR COMPANY, ENGINEERS
570 LEXINGTON AVE., NEW YORK 22, N. Y.
ATLANTA • TORONTO • CHICAGO
DENVER • LOS ANGELES
RESEARCH AND TESTING LABORATORIES
WESTPORT, CONN.
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PETREE & DORR DIVISION, NEW YORK 22, N. Y.
ASSOCIATES AND REPRESENTATIVES
Dorr Technical Services and Equipment Are Also Available Through Associated Companies and Representatives in the Principal Cities of the World. Names and Addresses on Request.

DORR

RESEARCH ENGINEERING EQUIPMENT

Another Thermoid First!

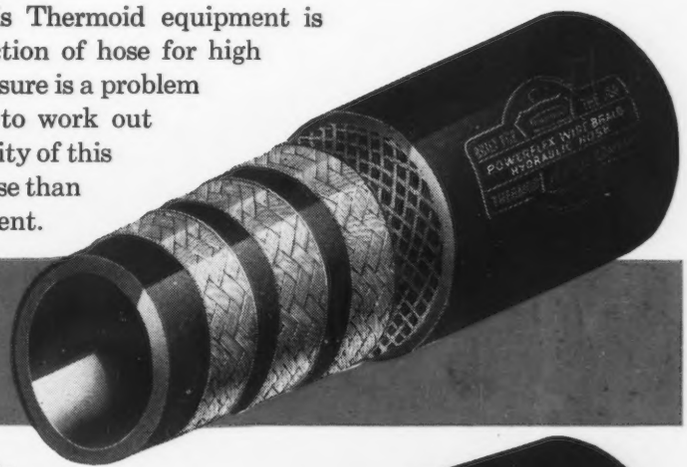
New Wire Braiding Equipment Produces Larger, Stronger Hose for High Pressures

The world's largest wire braiding machine specifically designed for the manufacture of hose is now in production at Thermoid's modern Nephi, Utah, plant. The possession of this equipment enables Thermoid to make wire braid hose in larger sizes and with greater strength than had previously been possible.

Hoses of 2, 3 or 4 braids can be made on this machine in sizes up to 2½" I.D. That means Thermoid can make hose that will rival pipe in strength but still have the flexibility of rubber. The specifications of Thermoid's hose for carrying high pressure are superior to any current production on the market.

If Pressure Is A Problem

In addition to the hoses specified below, this Thermoid equipment is available for special designs involving construction of hose for high pressure work. If you have a hose use where pressure is a problem give us the overall facts. We will undertake to work out a practical design that can use the unusual capacity of this machine to produce a stronger, more compact hose than could be made by any other method or equipment.



Powerflex Wire Braid Hydraulic Hose

Can now be produced in sizes from 3/16 to 2" I.D. in 50 ft. lengths, in 1, 2, 3 or 4 braids, working pressures from 500 to 5,000 lbs.

Powerflex Wire Braid Steam Hose

Practically burst-proof because of the wire braid reinforcing.

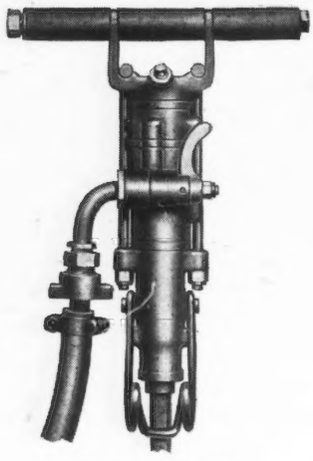
Recommended for pressures up to 200 lb. saturated steam. Specially compounded tube resists heat—asbestos cord layer dissipates heat and forms a permanent bond to the tough, rubber cover. Available in sizes ½ to 2½" I.D. and in lengths up to 50 ft.

The Thermoid line includes: Transmission Belting • F.H.P. and Multiple V-Belts • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Custom Molded Products • Industrial Brake Linings and Friction Materials.

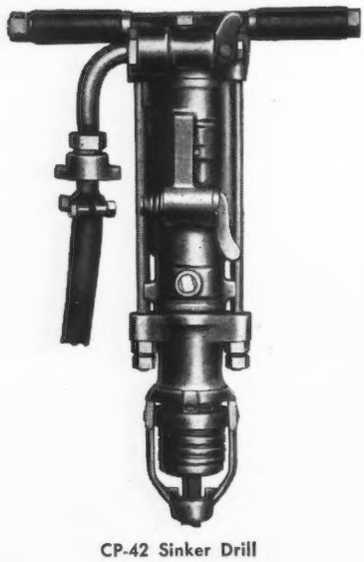
Thermoid

Thermoid Company • Main Offices and Factory • Trenton, N. J., U. S. A.
Western Offices and Factory • Nephi, Utah, U. S. A.
Automotive and Industrial Rubber Products • Friction Materials • Oil Field Products

CP Sinker Drill in operation at Benson Mines, Star Lake, N. Y.
Photograph through courtesy of Jones & Laughlin Steel Corporation.



CP-22 Sinker Drill



CP-42 Sinker Drill

There's a CP Sinker built for the job

For any type of sinker drilling, you'll find exactly the right equipment in the complete CP line of Sinker Drills, ranging from the light CP-22 to the heavy duty CP-60N.

For production work in soft to medium formations . . . block holing . . . lateral and overhead trimming . . . operating in restricted quarters — the CP-22 (30-pound class) is ideal. Perfectly balanced, it is easily operated by one man.

For shaft sinking . . . underhand stoping . . . general utility work in medium to hard formations — the CP-32 (45-pound class) is recommended. Its low air consumption adapts it for use with portable compressors.

Designed for shaft sinking in the harder formations . . . other heavy duty work — the CP-42 (55-pound class) has a longer stroke, although otherwise identical in design with the CP-32. Its powerful air blow keeps even the deeper holes free from cuttings. It can also be used on a board for horizontal drilling.

Write for Bulletin 850.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

ELECTRIC TOOLS • AIR COMPRESSORS • PNEUMATIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

ALLIS-CHALMERS "Certified" Service

A BREAKDOWN on this 39-year-old Allis-Chalmers fan motor crippled operations at the plant of an important midwest electric utility. Immediate repair was vital. The Chief Engineer called the nearest Allis-Chalmers Certified Service shop. They picked up the rotor and returned it ready for service in less than twenty-four hours.

This is the kind of emergency cooperation you can expect from every Allis-Chalmers Certified Service shop. On everyday repairs and maintenance too, your Allis-Chalmers Certified Service shop will give you prompt service on Allis-Chalmers motors, pumps and transformers, using factory approved methods and parts. Every Allis-Chalmers Certified Service shop has been selected for skilled, personal, careful workmanship, adequate equipment and *service mindedness.*

HOW TO FIND NEAREST SERVICE SHOP

Allis-Chalmers Certified Service shops are located in major industrial centers throughout the country. New shops are being appointed continuously and most smaller centers will soon be covered. To find the shop nearest you, call your closest Allis-Chalmers District Office. A 2543

MOTOR DELIVERIES GREATLY IMPROVED

Many types of Allis-Chalmers Motors are now in stock! Many other types are available on short delivery! For motors from 1 to 200 HP, check your nearest Allis-Chalmers Authorized Dealer. For motors larger than 200 HP, check with the nearest District Office. You may be able to get what you need sooner than you think.

ALLIS-CHALMERS, 969A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

UNION PACIFIC

The Governor of Nevada *invites You*

STATE OF NEVADA
EXECUTIVE CHAMBER
CARSON CITY

VAIL PITTMAN
GOVERNOR

To American Industry:

With the rapid increase in population of the United States, combined with the decentralization of industry and the westward movement, Nevada is destined for great industrial expansion in the near future.

Contributing factors are:

1. Cheap hydro-electric energy
2. Raw materials, with emphasis on livestock and minerals (metallic and non-metallic)
3. Other natural resources
4. Favorable labor conditions because of friendly relationships between industry, management and labor
5. Ideal climate and exceptionally favorable working conditions
6. Nevada's tax structure:
   - No Inheritance Tax
   - No Income Tax
   - No Sales Tax
   - No Tax on Intangibles
7. Unsurpassed transportation facilities and close proximity to water transportation.

I respectfully suggest that you investigate the opportunities and advantages Nevada offers industry for investment and expansion.

Cordially yours,

Governor

Vail Pittman

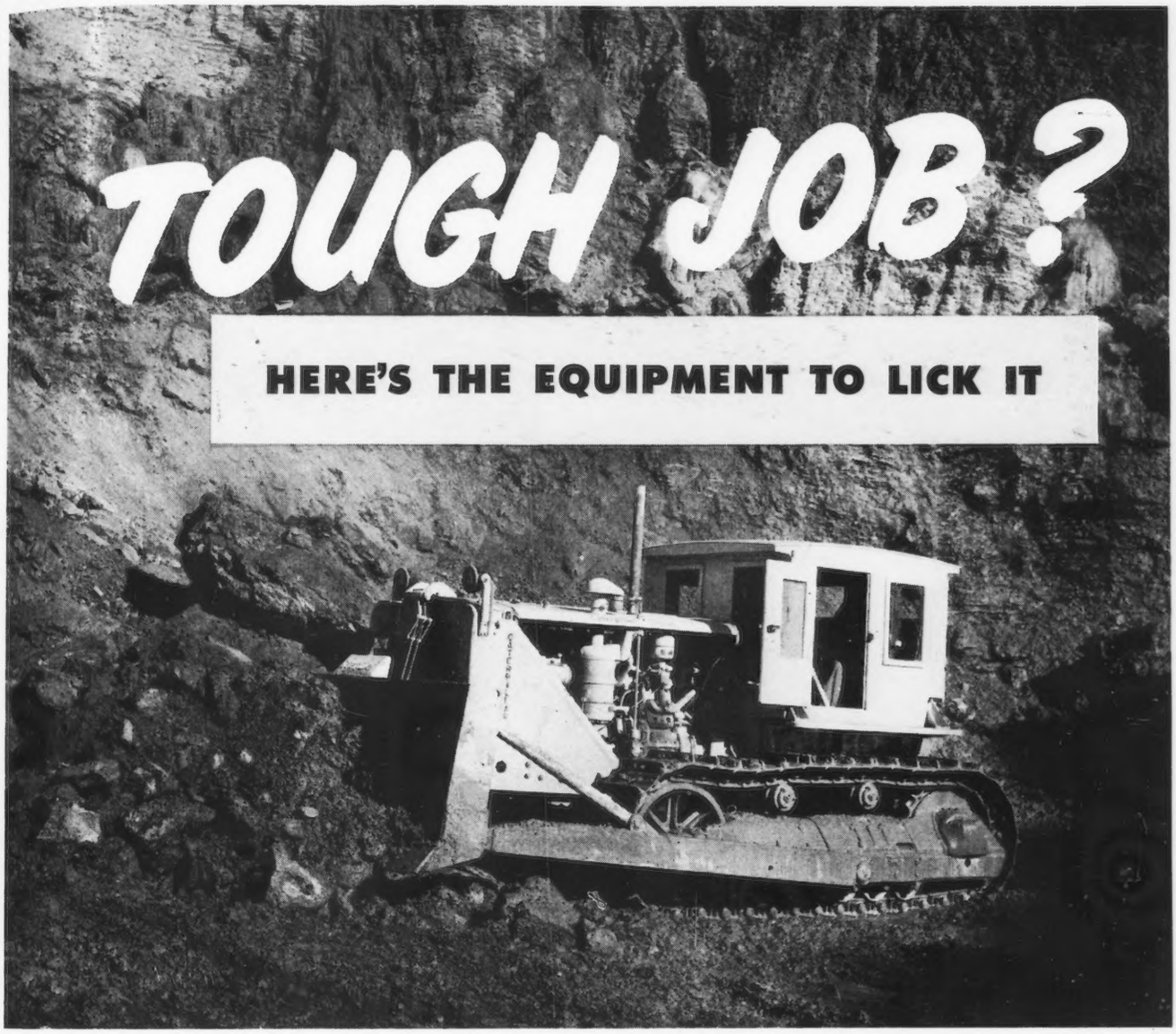
* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
Omaha 2, Nebraska

UNION PACIFIC RAILROAD

Road of the Daily Streamliner



A "Caterpillar" Diesel D8 Tractor, with cable-controlled "Caterpillar" No. 8S Bulldozer, clears away slide rock in the mine of Cleveland-Cliffs Mining Co., Bovey, Minnesota.

"Caterpillar" Diesels are designed and built to take on your toughest jobs and do them better, quicker and cheaper than you've ever seen them done before.

The "Caterpillar" Bulldozer is one example of a great line of earthmoving equipment matched exactly to the tractor that powers it. These 'dozers are equipped with either cable or hydraulic controls, straight or angling blades. But all models have the famous "Caterpillar" blade design and the exclusive rolling action that moves more earth with less wear and tear on the machine.

Cleveland-Cliffs Mining Co., Bovey, Minnesota, operates a fleet of "Caterpillar" Diesel Tractors for all types of 'dozing jobs around the mine.

Says the superintendent about his equipment: "A mine is a regular graveyard for machinery that has gone to pieces, but most of our 'Caterpillar' Diesels have been in service for a long while without spending too much time in the repair shop. All the operators like the machines."

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Get the Job Done QUICKER and at LOWER COST on Firestone

OFF-THE-HIGHWAY TIRES

ON ALL types of road building and grading jobs, Firestone Ground Grip Tires save money because they provide the traction to move more dirt and they have the strength and durability to stay on the job with a minimum of "downtime."

All Firestone Off-the-Highway Tires . . . the Rock Grip, the Ground Grip, and the All-Traction . . . are time savers because they furnish the performance to make your equipment move faster . . . do more work. They cut costly downtime to a minimum because they are engineered and built to stand up on jobs where other tires can't "take it."

Regardless of the type of projects you handle, Firestone Off-the-Highway Tires will cut your operating costs. Give them a trial and see if your work doesn't speed up while your tire expense goes down.

Listen to the Voice of Firestone every Monday evening over NBC

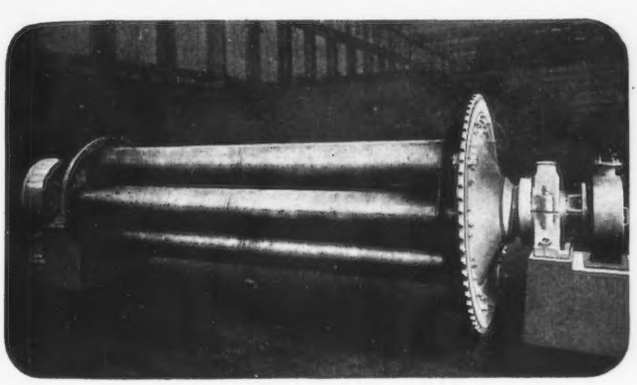
Copyright, 1948, The Firestone Tire & Rubber Co.

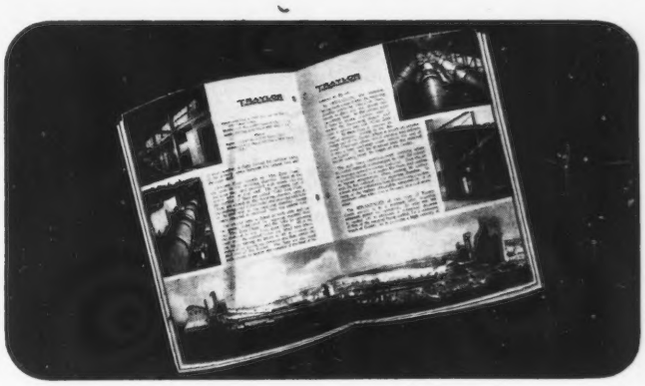
Firestone OFF-THE-HIGHWAY TIRES

40 Years Experience Goes a Long Way Toward Assuring Profitable Kiln Operation

For over forty years Traylor has been building Rotary Kilns. *Every one was designed for a specific operation.* The refinements to be found in every Traylor Kiln are based on that bedrock of experience. More efficient, low-cost production of a higher quality product is the result.

Traylor Kilns have rigid shells of heavy steel plates . . . electrically welded into a single piece! All circumferential joints are reinforced by steel bands into which the welding penetrates. The discharge end is similarly strengthened with a heavy steel band. Riding rings are accurately turned and faced. Steel gears and pinions are precision cut. Improved supports of the most suitable type for each installation are selected from the many advanced Traylor designs.



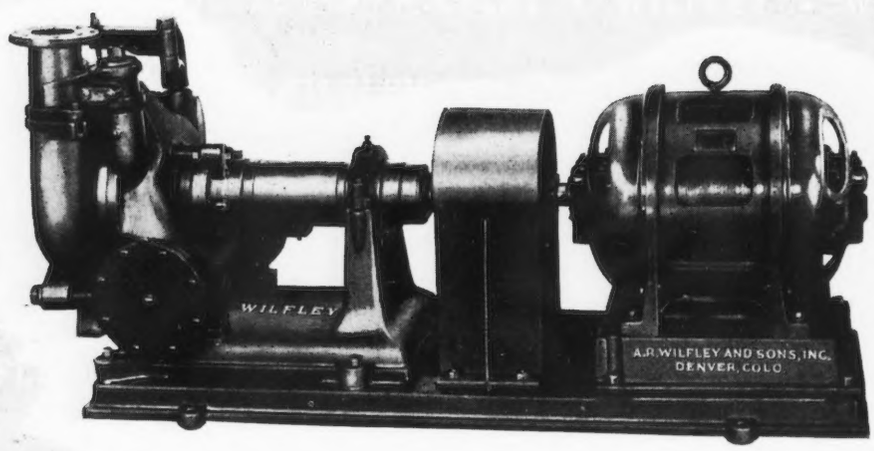


Traylor Rotary Coolers share all of the structural advantages of Traylor Kilns. They are built in four types. Each is "tailor-made" for the most efficient cooling of your material by air, water or a combination of both. You can select from single or multiple tube types . . . direct or indirect fired.

Traylor equipment is profit building equipment! Write today for illustrated Bulletin 115 which describes Traylor Rotary Kilns, Coolers and Dryers.

TRAYLOR ENGINEERING & MANUFACTURING CO.
104 Mill Street, Allentown, Pennsylvania
Canadian Manufacturer
Canadian Vickers, Ltd., Montreal, Que., Canada

TRAYLOR *Rotary Kilns, Coolers & Dryers*



Cost Saving Performance

Individual Engineering on every application—PLUS the exclusive principles of design and construction embodied in every WILFLEY pump—mean dependable, cost-saving high efficiency in handling sands, slimes and slurries. WILFLEY pumps enjoy an enviable reputation, kept up through the years by continuous pioneering, research, development and experience in the field. Heavy pumping parts of rubber, alloy iron, alloy steel—whatever material best suits your job. This is the pump to buy when you want continuous uninterrupted performance at extremely low cost. Write or wire for complete details.

WILFLEY
centrifugal PUMPS

A. R. WILFLEY & SONS, INC., DENVER, COLORADO, U.S.A.
New York Office: 1775 Broadway, New York City

Depend on tough, long-lasting Hewitt Air Drill Hose to deliver it steadily... surely... safely

No need to tell you that it takes a steady air power to complete your heavy-duty jobs on schedule.

Reason enough why alert mine operators the country over standardize on Hewitt air drill hose. They know that its rugged construction provides maximum protection against abrasion and impact . . . assures steady, sure, safe delivery of air under rigorous conditions.

These are reasons why you, too, will appreciate the day in, day out dependable service given by Hewitt air drill hose once you get it on the job. You'll find it flexible, non-kinking, easy to handle, and resistant to all kinds of weather conditions, too.

You can get Monarch brand for use where hot oil conditions are especially severe. Or you can get Ajax brand for use in mines and quarries where wrapped-duck construction is preferred. For the type you need, phone the Hewitt distributor listed in the classified section of your phone book. Or write Hewitt Rubber Division, 240 Kensington Avenue, Buffalo 5, New York. No obligation!

HEWITT

AIR DRILL HOSE

4 BIG REASONS WHY HEWITT AIR DRILL HOSE GIVES DEPENDABLE SERVICE:

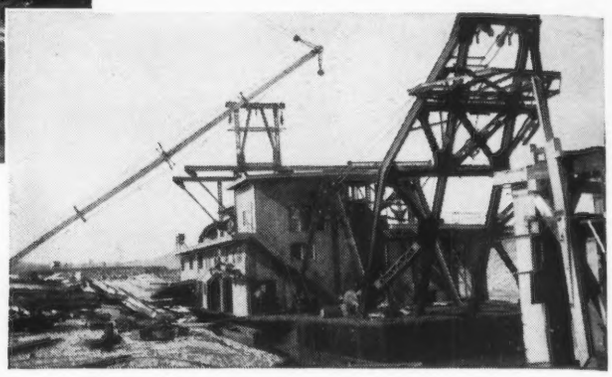
1 Tube does not swell nor flake—made of tough, non-porous, oil-resisting rubber compound.

2 Maximum flexibility and protection against moisture penetration are assured by special rubber friction between braids.

3 Resists abrasion, impact, sun-checking and weathering because of its tough, specially compounded rubber cover.

4 High burst-resistance—carcass made of multiple braids of tightly twisted, high-tensile cord.

HEWITT RUBBER DIVISION **HEWITT-ROBINS INCORPORATED**



Capital Dredge No. 2 (upper photo) as rebuilt from YCGF No. 3 in 1927 near Folsom. (Lower photo) YCGF No. 3 being rebuilt for first time in 1914 at Hammonton.

NEW LIFE *for* OLD DREDGES . . . *CONSULT YUBA*

Read here how Yuba redesigned and rebuilt YCGF No. 3 three times in 42 years for three different dredging fields, each time increasing average operating time and yardage.

Yuba Consolidated Gold Fields Dredge No. 3 was built in 1906 at Hammonton (Calif.) with wood hull and 7 cu. ft. buckets to dig 60′ below water level. Original designer was Western Engineering and Construction Co., a predecessor of Yuba Manufacturing Co.

1914—BUCKET SPEED INCREASED

In 1914, Yuba rebuilt YCGF No. 3, using a standard steel hull and increasing the digging depth to 61′ 6″ below water level. Bucket drives were redesigned to up bucket line speed from 18.6 to 22.8 buckets per minute.

1927—CAPACITY INCREASED

In 1927, Yuba dismantled YCGF No. 3, including hull, and moved it to Folsom (Calif.), where it became Capital Dredge No. 2. Main drive machinery was redesigned to improve its wearing qualities and get greater average daily operating time. Bucket capacity was increased to 8½ cu. ft. and digging depth changed to 50′ below water level.

MOVED AND REBUILT THIRD TIME

In 1938, this dredge was again dismantled, moved by Yuba to Biggs (Calif.) and its name changed to Biggs No. 2. The steel hull was re-erected with added pontoons and the digging depth changed to 47′ below water level. The same 8½ cu. ft. buckets were retained, but use of deeper lips increased their actual capacity to 9 cu. ft.

OPERATING RECORDS

Each time Yuba redesigned and rebuilt this dredge its operating efficiency increased, as the following records from annual reports show:

Dredge	Field	Average Daily Yardage	Average Daily Operating Hours
YCGF No. 3	Hammonton	2,691 cu. yds.	18.317 hours
(No. 3 re-constructed)	Hammonton	4,146 cu. yds.	20.633 hours
Rebuilt as Capital No. 2	Folsom	7,034 cu. yds.	21.456 hours
Rebuilt as Biggs No. 2	Biggs	10,368 cu. yds.	22.10 hours

YCGF No. 4 (later Capital No. 1, and now Biggs No. 3), sistership of YCGF No. 3, was similarly redesigned and rebuilt and has a similar operating record in the same three dredging fields.

HELP ON YOUR DREDGE PROBLEMS

No matter what your dredging problem—deep ground, hard bedrock, boulders, levee or stream control—Yuba, from its 40 years' experience of solving such problems for others, can help you. We will build a new dredge for you, help you obtain a good used dredge; or move, redesign and rebuild an old one (whether a Yuba or not). Take advantage NOW of Yuba's experience. Write or wire—

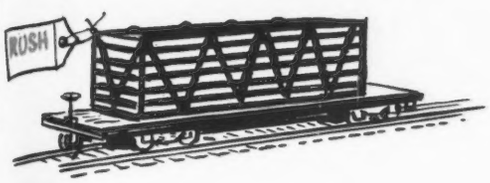
YUBA MANUFACTURING CO.

351 California St., San Francisco, California, U. S. A.

AGENTS { SIME, DARBY & CO., LTD. · SINGAPORE, KUALA LUMPUR, PENANG.
SHAW DARBY & CO., LTD., 14 & 19 LEADENHALL ST., LONDON, E.C.3.

CABLES: YUBAMAN, San Francisco · SHAWDARBCO, London

WHAT'S A Delivery Promise THESE DAYS?



A promise is still a promise, and Colorado Iron Works is proud to be known as a promise keeper. There's a rule of long standing at Colorado Iron that no delivery is to be missed—ever.

Here is a recent example of the appreciation prompt deliveries receive:

"The management has asked me to write you and express our appreciation at receiving this machine right on schedule. We realize how difficult it is to meet delivery promises these days, and you and your organization are to be congratulated on the manner in which our order was handled. It has helped us a great deal at this end, and will enable us to have the densifier in place with all connections made several days ahead of the anticipated date."

This is a paragraph quoted in its entirety from a letter dated Sept. 30, 1948, from the American Zinc Company of Tennessee after receipt of a 48" Akins densifier from Colorado Iron Works Company.

Quality must be maintained with delivery. Colorado Iron engineers have consistently turned out products which are capable of giving better results than were originally specified, say the operators.

Ask for the figures that prove these statements—we have them! For top performance and on-time delivery, permit our engineers to consult on your milling problems and plans.

A battery of five Akins classifiers in use at the Noralyn mine of International Minerals and Chemical Corp.

COLORADO IRON WORKS COMPANY

MAIN OFFICE & WORKS, DENVER 2, COLO., U.S.A.

Canadian Locomotive Co., Ltd., Kingston, Ont., Can.; Head, Wrightson & Co., Ltd.; Stockton on Tees, Eng.; John Carruthers & Co. (Pty.) Ltd., Sydney, Aus.; Vancouver Iron Works, Ltd., Vancouver, B. C., Can.; Head, Wrightson & Co., S. A. (Pty.) Ltd., Johannesburg; Edw. J. Nell Co., Manila, P. I.

Get this Bonus...

50 to 100% longer tire life..

Reduced road maintenance

along with

increased tonnage and lower hauling cost!

WHEN you put Walter Tractor Trucks on your pit run, you soon discover money-making "extras" found in no other truck . . . resulting from the great power and super traction of the Walter 4-Point Positive Drive.

Your first discovery is the extra tons delivered, because you haul 40-ton payloads per trip and make more trips per shift. Walter Tractor Trucks haul huge loads at good speeds, climb steepest grades, maneuver easily and quickly at shovel and dumping point, which permits more hauling cycles per hour.

You next discover extra days of production in bad weather and difficult running conditions, because Walter Tractor Trucks continue hauling when other trucks are stopped. You further discover that your Walter Tractor Trucks stay on the job and out of the repair shop; that your roads stay in good condition; that your tires show much less wear.

LONGER TIRE LIFE — LESS ROAD DAMAGE

With the smooth, positive traction of the Walter 4-Point Positive Drive, there is never wheel spinning to grind tires and gouge roads. Secondly, the Suspended Double Reduction Drive reduces unsprung weight permitting tires to follow the contour of depressions and bumps without losing contact. This cuts down the bouncing, pounding and overheating of tires and is easy on mine roads. Many mines report 50 to 100% longer tire life through this Walter feature.

• Walter Tractor Trucks are proved by years of outstanding records in iron and coal mines. Learn more about these "extras" by writing for new folder "Walter Tractor Trucks for Tonnage Hauling."

WALTER TRACTOR TRUCKS

WALTER MOTOR TRUCK CO., 1001-19 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

a thousand and one

job-proved wire ropes

There's a Macwhyte rope
that's the right rope
for your equipment

Use PREformed Whyte Strand for easy handling and longer service.

Macwhyte Distributors and Mill Depots — carry stocks for immediate delivery. For maximum safety, service and economy, ask Macwhyte representatives to recommend the correct rope for your equipment. Catalog G-15 on request.

MACWHYTE COMPANY

2937 Fourteenth Avenue • Kenosha, Wisconsin

Manufacturers of
Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cable and Assemblies.
Distributors throughout U. S. and other countries.

Mill Depots:
New York
Pittsburgh
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. . . THE LAST WORD IN GEIGER MÜLLER PORTABLE SURVEY INSTRUMENTS

SMALL

COMPACT

LIGHTWEIGHT

WATERPROOF

STRONG

RUGGED

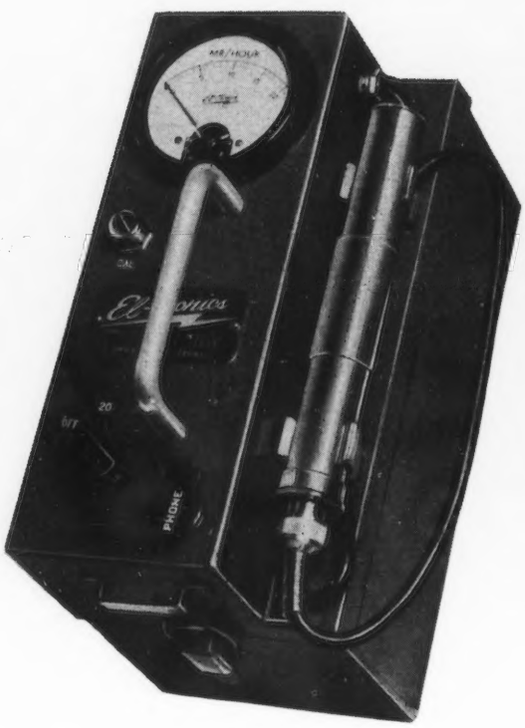
New in Every Way . . . The Greatest Advance in Geiger Müller Portable Survey Meter Design in Years

Long Battery Life . . . **No** zero drift . . . Fast Indication . . . Change Batteries without tools. 3" meter . . . Accurate Calibration.

STRONG WELDED ALUMINUM CASE . . Smooth finish to minimize contamination. Waterproof construction throughout.

3 INCH WATERPROOF METER . . . DIRECT READING IN THREE FULL SCALE RANGES OF 0.2, 2.0 AND 20 MR PER HOUR . . Reaches 90% of final reading in 3 seconds. Accurate linear calibration.

Battery Life In Excess of 200 Hours. Incorporates Counter Tube Sensitive to Both Beta & Gamma Radiation. Provision for Shoulder Strap and Earphones. Uses Standard Easily Obtainable Radio Tubes. Has Sliding Beta Ray Shield On Probe.



MODEL SM3
BETA-GAMMA SURVEY INSTRUMENT
PRICE $225 Complete with all tubes and batteries and ready to operate.

WEIGHS ONLY 8¾ POUNDS
Only 4½" Wide, Only 6" High, Only 9¼" Long. Low center of gravity to prevent upset.

SEND FOR DESCRIPTIVE BULLETIN NO. 486

A modern fully equipped plant of 15,000 square feet devoted to the manufacture of Geiger Müller apparatus.

El-Tronics INC.

Manufacturers of Geiger Müller counter apparatus for nearly 14 years.

2647-67 N. HOWARD STREET, PHILADELPHIA 33, PA.

the vital requirement:

dependably provided by **EDISON** ELECTRIC CAP LAMPS

for over thirty years . . .

The ever-increasing importance of *teamwork* in today's mining puts heavy emphasis on the *dependability* of production equipment, particularly the miner's personal cap lamp.

Light must not fail, for any member of a working group, if full production is to be maintained.

The EDISON Electric Cap Lamp provides unrivalled dependability for the wearer—unfailing, brilliantly effective light at the working place throughout the entire shift—and holds a more than thirty-year record of sterling performance. May we show you in a practical demonstration the reasons-why?

MINE SAFETY APPLIANCES COMPANY
BRADDOCK, THOMAS AND MEADE STREETS . . . . . PITTSBURGH 8, PA.

District Representatives in Principal Cities

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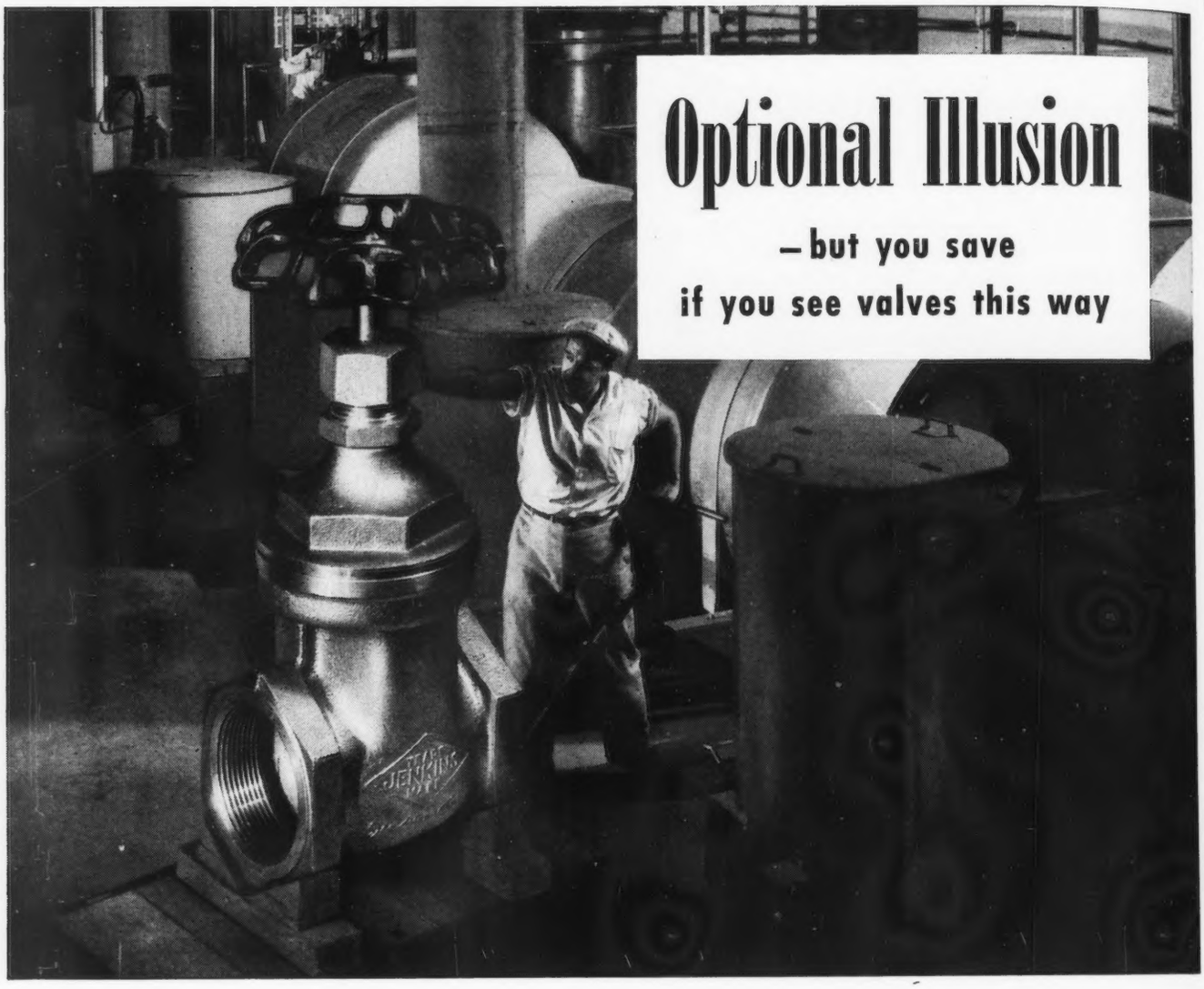
MINE SAFETY APPLIANCES COMPANY OF CANADA LIMITED
TORONTO . . . MONTREAL . . . CALGARY . . . WINNIPEG . . . VANCOUVER . . . NEW GLASGOW, N. S.

SOUTH AMERICAN HEADQUARTERS
Casilla 733, Lima . . Agents in Principal Cities

MINE SAFETY APPLIANCES CO. (S.A.) (PTY) LTD.
Johannesburg, South Africa N'Dola—Northern Rhodesia



THERE ARE TWO WAYS of regarding the valves in your plant. You can think of the relatively small cost of a single valve, and dismiss them as a minor, "petty cash" investment. Or, you can think of *all* valves in your plant as *one* valve, as pictured, by photo-magic, in this pharmaceutical plant, — and see them in proper perspective.

YOU'LL FIND IT PAYS to take the latter view, for in *any* plant, *any* building where fluid control is involved, valves, collectively, are as important, in terms of investment and operating expense, as larger plant units, and should be selected with the same sharp eye to quality and economy.

EXCESSIVE MAINTENANCE of one inferior valve is insignificant, but multiplied by thousands, it is a serious drain on operating budgets. JENKINS BROS. helps you meet this problem two ways. First, by building extra endurance into Jenkins Valves, making them the longest-lasting, lowest-upkeep valves that money can buy. Second, with advice from Jenkins Engineers on any question of proper selection, installation, or maintenance.

For all new installations, for all replacements, rely on Jenkins quality and engineering for lowest valve costs in the long run. *Sold through leading Industrial Distributors.*

•

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

"PRACTICAL PIPING LAYOUTS" is a 32-page book containing diagrams and descriptions of 25 basic piping layouts with complete recommendations for valve selection and location in the lines. Tells you "which valve where for best performance". FREE on request. Write JENKINS BROS., 80 White Street, New York 13, N. Y.

LOOK FOR THIS DIAMOND MARK

SINCE 1864

Jenkins Bros

JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

Q. What one method of detonating has these five advantages over any other method?

A. The PRIMACORD method . . .

1. Primacord extends the full depth of a hole, contacting every cartridge in the load. Thus, *it initiates the entire charge at maximum power.*
2. Primacord can be hooked up for multiple-hole shots so that *it fires front lines a split-second before succeeding ones.* This permits you to plan for ideal relief of burden and secure better fragmentation.
3. Since Primacord is a non-conductor, *it is insensitive to any stray electric currents,* and is the only logical detonator to use around high-voltage equipment or wherever lightning storms are common.
4. Primacord reduces loading time because *it hooks up quickly and easily* with square knots for the main lines and half hitches for down-hole connections.
5. Wound on easy-to-handle spools, *Primacord comes in grades to meet every blasting condition.*

Blasters who use Primacord consistently agree there is no substitute. For more information ask your explosives supplier . . . or write us direct. The Ensign-Bickford Co., Simsbury, Connecticut. P-6

PRIMACORD-BICKFORD Detonating • Fuse •

Also Ensign-Bickford Safety Fuse Since 1836

Contractor builds roads, business and good will ...with company-owned Bonanza

C. P. BALLENGER, JR., B.S.C.E.

BALLENGER PAVING COMPANY

Paving and Concrete Contractors

TELEPHONE 2-1845
P. O. BOX 1046

WAREHOUSE AND OFFICE
LEE ROAD, PARIS STATION
GREENVILLE, SOUTH CAROLINA

Mr. Walter H. Beech
Beech Aircraft Corporation
Wichita, Kansas

Dear Mr. Beech:

As you know, we are in the roadbuilding business with our principal office in Greenville, South Carolina. Besides using our Bonanza for transporting key personnel, we utilize it to carry small repair parts - which has turned out to be quite a selling point for us. We find our Bonanza is good advertising and builds good will, too.

Recently in the course of five days' time we made calls in 12 cities, covering 4,000 air miles in approximately 25 hours flying time. Business was transacted at every stop. We feel that to complete that schedule by surface travel would have taken at least two weeks.

Our Bonanza has flown from fields with 6,000 feet concrete runways and 1,400-foot dirt strips - and is at home on either. In our opinion Beechcraft has done a good job of making a low cost, high performance airplane.

Sincerely yours,

BALLENGER PAVING COMPANY

C. P. Ballenger, Jr.

The point of Mr. Ballenger's story is simply this: You can do *more* business in *less* time with company ownership of the fast, versatile Bonanza. You get there at a 170-mph clip no matter where the job is located. And mining men—as well as engineers and contractors—with "off the main line" field work will particularly appreciate this new kind of mobility. Surprisingly low operating cost, too. Investigate Bonanza ownership.

● A note on your company letterhead will bring an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

Top speed, 184 mph
Cruising speed, 170 mph
Range, 750 miles

BEECHCRAFT BONANZA MODEL A35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

IN NEED OF
Diamond Bits?
Longyear can supply them

Drilling conditions vary with the kind of rock . . . hard or soft, tough or abrasive, friable, fractured or solid, or homogeneous.

Bit construction differs as to: 1) size and grade of diamonds, 2) type of matrix, 3) setting of diamonds; i.e., surface set, or impregnated.

For best results, your bits should suit the job. Qualified by years of experience, Longyear will aid in the right selection for your exploratory or blast hole drilling.

A complete stock of standard types and sizes of coring bits, casing bits, and reaming shells is maintained by Longyear. Special bits can be obtained on order.

Your Inquiries
Will Be Given Our Immediate Attention

We also carry in stock standard diamond drilling supplies, water swivels, hoisting plugs, core barrels, and other accessories.

E. J. LONGYEAR COMPANY

MINNEAPOLIS, MINNESOTA, U.S.A. NEW YORK OFFICE, 1775 BROADWAY

CANADIAN LONGYEAR, LIMITED, NORTH BAY, ONTARIO, CANADA

DIAMOND CORE DRILLS • CONTRACT CORE DRILLING
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS

REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES

Mining Magic!

Pioneer Semi-Portable WASHING PLANT

Dismantled–moved 2½ miles–IN ONLY 86 HOURS

You're not looking at two PIONEER Washing Plants. You're looking at the same plant twice, and pictures were taken 2½ miles apart!

In 1942 one of the large mining companies on the Mesabi Range set up a PIONEER Semi-Portable Washing Plant (top photo). In three seasons this PIONEER Washing Plant produced over one million tons of iron ore concentrates.

In 1947, when the first mine was exhausted the Washing Plant was moved to another site *two and one-half miles away.*

The plant was dismantled, hauled by truck and trailer to the new site in only 86 hours.

At the new mine (lower photo) the PIONEER Washing Plant operates on crude ore and produces an average of 1,350 tons of iron ore concentrates per shift.

Here's proof again of the superb engineering and planning that goes into every piece of PIONEER *Continuflo* Mining Equipment. Call or write us today for complete information on PIONEER Feeders, Crushers, Conveyors, Screens or Washing Plants.

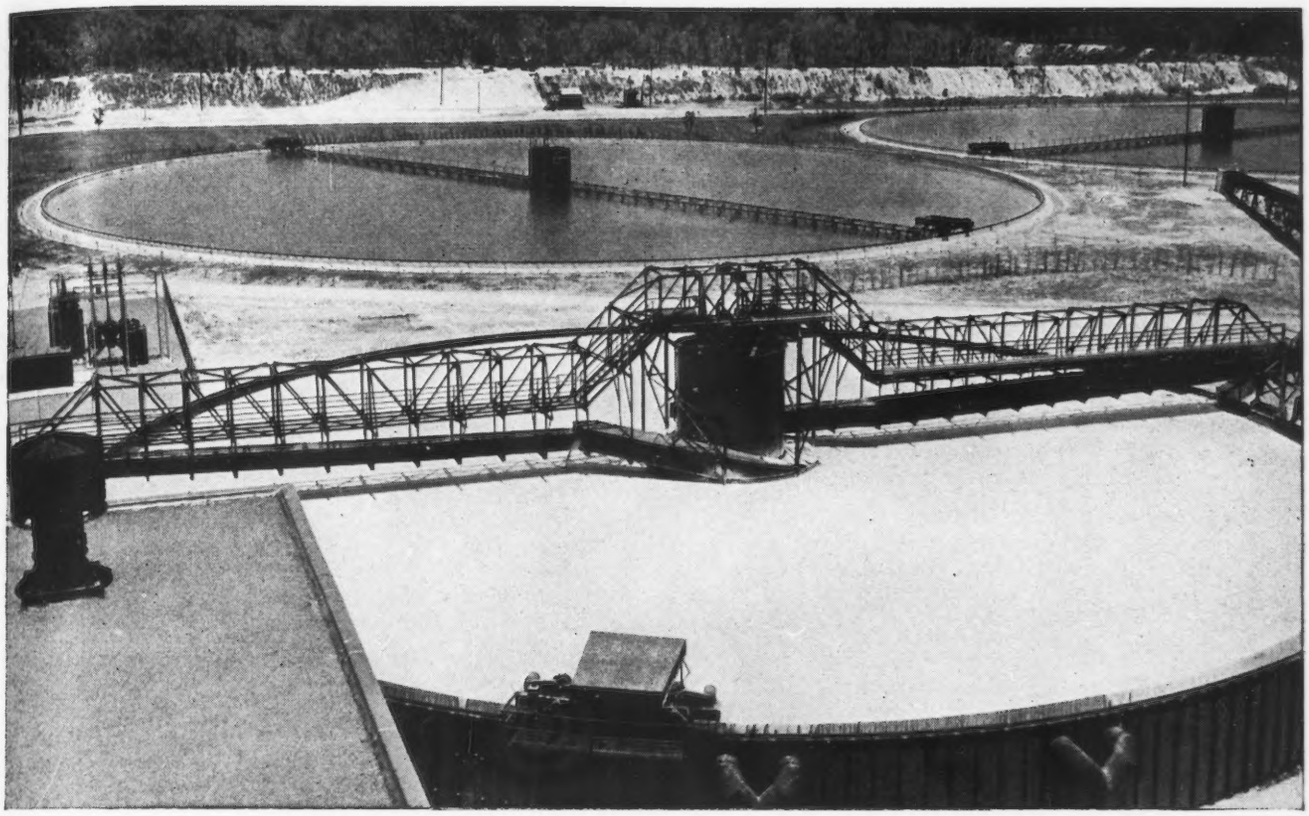
PIONEER ENGINEERING WORKS
1515 Central Avenue • Minneapolis 13, Minnesota

BUY BOTH!

Higher Output, Lower Upkeep!

Pioneer

Continuflo **EQUIPMENT**



GENERAL AMERICAN EQUIPMENT at the NORALYN Plant of the INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Above is photo taken across the top of the 175' in diameter General American Hydroseparator showing the two 383' in diameter General American Thickeners for water clarification.

Other General American equipment at this plant includes ten additional hydroseparators and 68 Turbo flotation cells for roughing and scavenging.

This plant, designed to produce 1,500,000 tons of phosphate per annum, is the world's biggest phosphate plant and also the largest plant engaged in floating a non-metallic mineral.

When the operating and research staff of the International Minerals and Chemical Corporation are ready to release operating and performance data, General American engineers will be glad to give you further details.

Other GENERAL AMERICAN EQUIPMENT

DRYERS
DEWATERERS
FILTERS
THICKENERS
TURBO-MIXERS
BINS
STORAGE TANKS
KETTLES
LADLES
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STEEL AND ALLOY PLATE FABRICATION

GENERAL AMERICAN TRANSPORTATION CORPORATION

Process Equipment Division

SALES OFFICE: 10 East 49th St., Dept. 810, New York 17, N. Y.

WORKS: Sharon, Pa., East Chicago, Ind.

PROCESS EQUIPMENT DIVISION GENERAL AMERICAN TRADE MARK

OFFICES: Chicago, Cleveland, Louisville, Orlando, Pittsburgh, St. Louis, Salt Lake City, Sharon, Washington, D. C.

Each Rollway Bearing takes only its specific load . . . The radial bearing takes radial loads; the thrust bearing takes thrust loads. In this simple but effective way, Rollway's Right Angle Loading eliminates compound loads and complicated stresses. Specifically, it splits your load in two.

Rollway Right–Angle–Loading helps your machines to run longer . . . under heavier loads . . . with lower maintenance cost

It reduces the unit loading on rollers and bearings. Insures lower starting and running torque. Eliminates all resultants from oblique loads, all piling up of thrust and radial loads on the same bearings. Reduces roller end-rub and roller wear-back . . . avoids roller pinch-out . . . provides greater resistance to shock.

Lower maintenance!
Fewer shut-downs!
Less replacements!

FREE SERVICE

Send us your designs for bearing analysis and recommendations. All information held confidential.

ROLLWAY BEARING CO. INC.
Syracuse, N. Y.

ROLLWAY
RIGHT-ANGLE-LOADED
BEARINGS

OFFICES IN: PHILADELPHIA • BOSTON • PITTSBURGH • CLEVELAND • DETROIT
CHICAGO • MINNEAPOLIS • BIRMINGHAM • HOUSTON • LOS ANGELES

Onan standby electric plants, made by D. W. Onan & Sons, Inc., of Minneapolis, are widely used to protect business, hospitals, theaters, public buildings, farms and homes against costly powerline failures. With reliability of top importance on such jobs, Ford Industrial Engines are standard on many Onan models. Pictured is a 10,000 watt model powered by the Ford 120 Four Cylinder Industrial Engine.

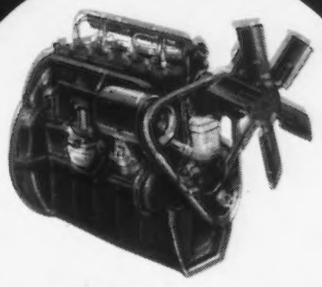
Use FORD *Industrial Power...*

Be Right 3 Ways!

1 **RIGHT POWER**—your choice of five rugged new models in the Ford Industrial Engine line. There's one *just right* for your power problem.

2 **RIGHT FEATURES**—you're always right up to date when you specify Ford Power. Every model has all the latest benefits of Ford's famed progressive engineering.

3 **RIGHT SERVICE**—as near to you as your Ford Dealer, with complete facilities and "know-how" to keep Ford Industrial Engines on the job for maximum use, lower costs.



Ford 120 Four Cylinder Industrial Engine (120 cu. in. displacement)

Ford Get acquainted with the new Ford "Power-Family" . . . five great industrial engines—a "four" of 120 cu. in. displacement . . . two "sixes"—226 cu. in. and 254 cu. in. displacement . . . two "eights"—239 cu. in. and 337 cu. in. The *right* power for you, and every one completely new! Send post card today for full specifications and—for power, pick Ford!

FORD MOTOR COMPANY
INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT
Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

Thor "200" STOPER ROCK DRILL

SPEEDS TUNNELLING

LARGE TONNAGE PRODUCING MINES find Thor No. 200 Stoper "pays for itself" where over-head rock must be removed in tunnelling haulage roads for high speed movement of mechanized equipment.

Light . . .

Small . . .

POWERFUL . . .

Easy to Handle . . .

With automatic feed, *one* No. 200 Stoper gets the drilling done as fast as two crews with hand-held hammers! Many exclusive features are incorporated in the 75-pound Thor No. 200—automatic rotation . . . an exceptionally long-life chuck that permits swedging when worn . . . automatic oiling to *all* parts . . closed side rod nuts . . . fully air cushioned piston . . . and oversize feed leg for stability. Call your Thor distributor for a demonstration.

INDEPENDENT PNEUMATIC TOOL COMPANY

Aurora, Illinois

Export Division: 330 West 42nd Street, New York 18, N. Y.

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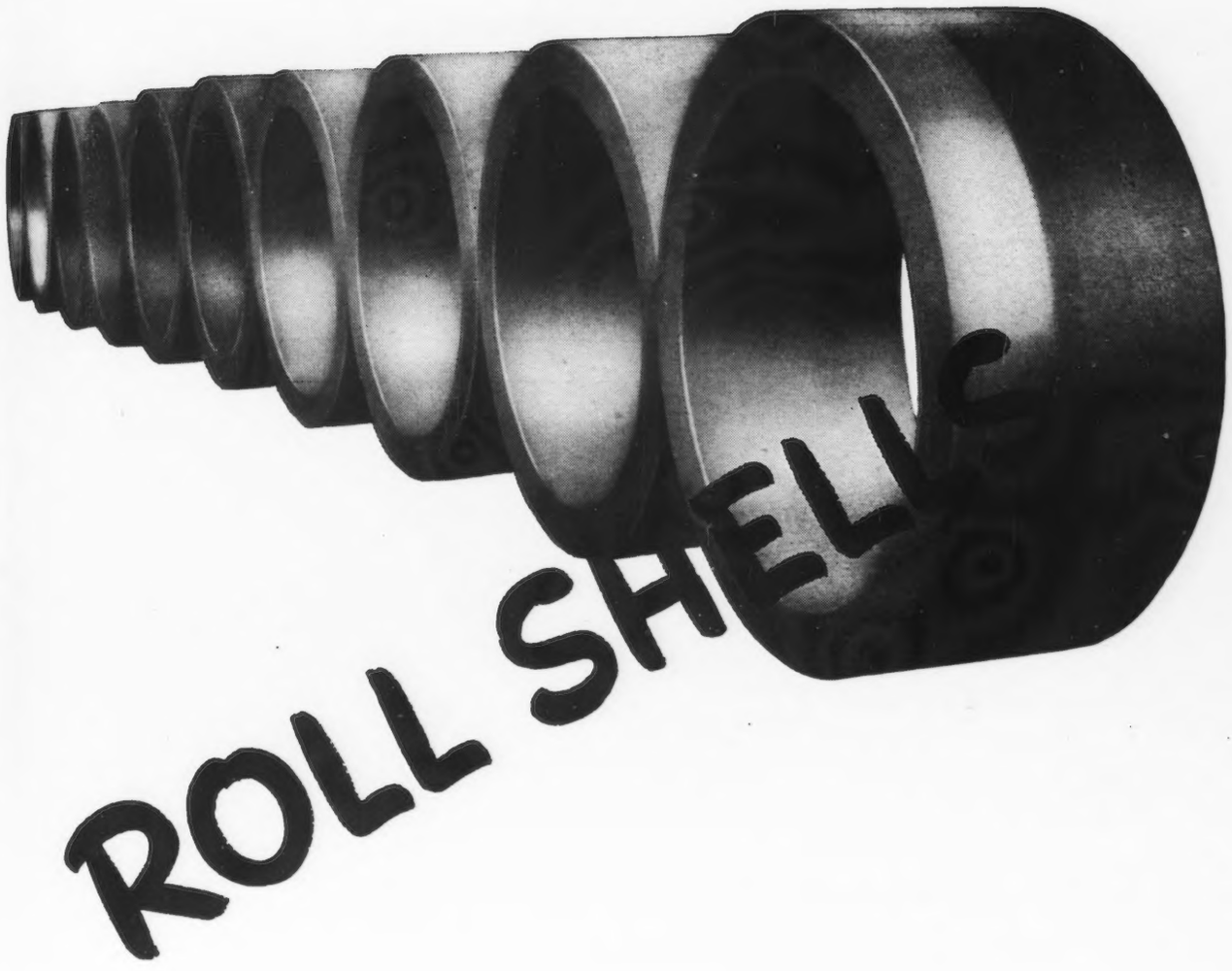
Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS



Midvale custom steel making includes identical shells like these, which must be hard enough to withstand grinding action and tough enough to take shock. Such work finds Midvale particularly well prepared with all necessary equipment and special experience. Midvale delivers on time and to specification . . . a factor as faithfully to be relied upon as those involving technical aspects of production.

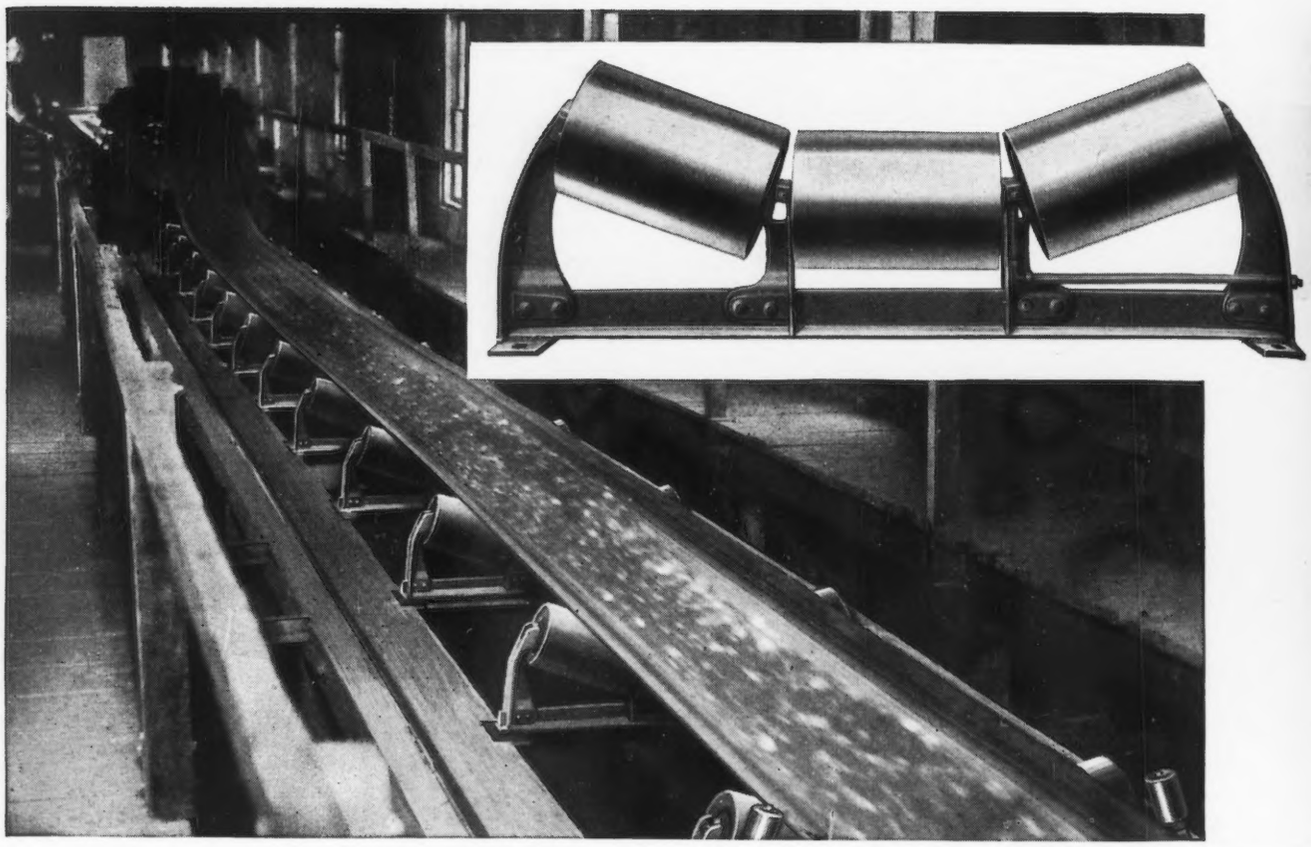
THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
WASHINGTON • CLEVELAND • SAN FRANCISCO

MIDVALE

Custom Steel Makers to Industry

STAINLESS AND TOOL STEEL BARS
•
CORROSION AND HEAT RESISTING CASTINGS
•
FORGINGS AND RINGS



Link-Belt Standardized Design Cuts Belt Conveying Costs

In the Link-Belt "100" series belt conveyor idlers, we believe that we have achieved the ultimate in design and performance, with evolution of engineering features progressively since 1896. These features cut conveying costs by reducing maintenance, giving longer service, and permitting the greatest simplification.

In addition to idlers, Link-Belt builds a great variety of standardized design conveyor elements and accessories such as: belt and apron feeders for uniform loading; trippers for intermediate discharge or distribution; drives using gears, reducers and chains; terminal machinery; supporting structures and enclosures.

We are at your service for complete conveyor systems, or individual equipment, to suit your requirements.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Atlanta, Dallas 1, Minneapolis 5, Denver 2, Kansas City 6, Mo., Los Angeles 33, San Francisco 24, Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Vancouver, Toronto 8.

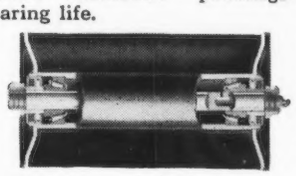
11,211

LINK-BELT

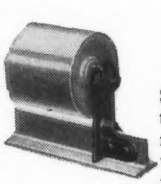
BELT CONVEYOR EQUIPMENT

IDLERS • TRIPPERS • BELTS • PULLEYS • BEARINGS • DRIVES

Grease-in—Dirt-out Seal
prevents harmful foreign matter from reaching bearings — conserves lubricant — prolongs bearing life.



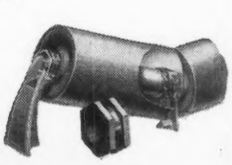
Rolls
made with smooth rounded-edge outer shell of uniform thickness, and a full-length steel central tube, both continuous-welded to dished steel heads to form sturdy, well-balanced integral units.



Strong Brackets Support the Rolls

Supporting brackets are tough malleable iron in reinforced T-section to withstand load and impact.

Interlocking Nuts and Yokes Prevent Brackets from Spreading



Impact Idlers with Rubber Treads

Interchangeable with steel rolls this type provides a Cushion at loading points to protect idlers and preserve the belt — A good investment where heavy lump materials are handled.

Higher Recoveries through DOUBLE-CHECKED FLOTATION

Z-6

PENTASOL AMYL XANTHATE

• Pentasol Amyl Xanthate (Z-6) has proven itself from research to industry by sheer performance. Made from a blend of 5 Sharples Amyl Alcohols, Pentasol Amyl Xanthate —due to its unusual ability as a "collector" —has helped many mills recover important values from low-grade ores, from old tailings dumps, and from ores already yielding good percentages.

The commercial product is Bear Brand Z-6 manufactured by Great Western Division, the Dow Chemical Company. Your samples for a test run will be sent promptly upon request.

SHARPLES TRADE MARK CHEMICALS

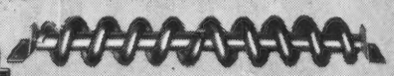
SHARPLES CHEMICALS INC.

123 SOUTH BROAD STREET • PHILADELPHIA 9, PA.

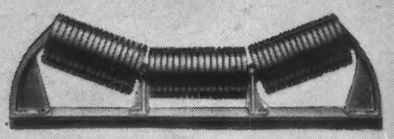
KEEP YOUR BELT "On the Beam"

with Rex Self-Aligning Idlers . . .

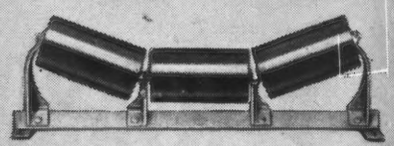
A FEW OF THE REX IDLER LINE:



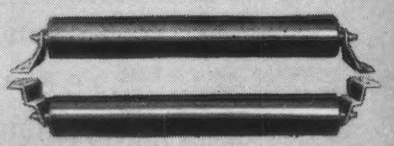
Rex No. 55 Rubber-Covered Spiral Return Idler . . . creates an ever-changing point of contact to keep moisture, ice, abrasive and sticky materials from building up on the belt.



Rex Style No. 35 Impact Cushioning Idler . . . dual purpose rubber rolls cushion shocks at loading points . . . minimize belt rupture and lacerations.



Rex No. 32 Troughing Idler . . . is roller-bearing equipped, can be furnished with steel or gray iron rolls. Has no shelves or pockets to catch dust . . . is self-cleaning.



Rex No. T-6 Flat Belt and No. T-1 Return Idlers . . . are dead shaft type idlers. They are equipped for high pressure grease lubrication . . . have hydraulic type fittings.

● Off-center loading, side-wind drifting, warped frames, or uneven belt stretch won't bother your conveyor belts *if* you install a few Rex Self-Aligning Troughing Idlers.

These dependable idlers assure automatic belt alignment without the need for side-guide idlers that impose excessive belt edge wear. The idler roll assembly is so mounted on a roller-bearing turntable that any weaving of the belt away from the center line will swing the idler into an angular position and thereby automatically guide the belt back to the conveyor center line. Damage to belts from running off is eliminated.

The Rex Self-Aligning Idler design is completely flexible. The idlers are made to fit into any belt conveyor frame, and with any make of idler . . . important features that simplify installation and maintenance. With Rex, the belt can be run in either direction.

A Rex Idler Specialist will be glad to give you all the facts on the idlers that keep your belts "on the beam." Or, if you prefer, write for your copy of Bulletin No. 463. Chain Belt Company, 1679 West Bruce Street, Milwaukee 4, Wis.

CHAIN BELT COMPANY — REX — BELT CONVEYOR IDLERS

Cummins Diesels Save Fuel

Compare the cost! **Operate a Cummins Diesel alongside other engines—diesel, gasoline, or butane—then check your fuel bills. Here's what our customers report:**

Annual Savings: $2620.00

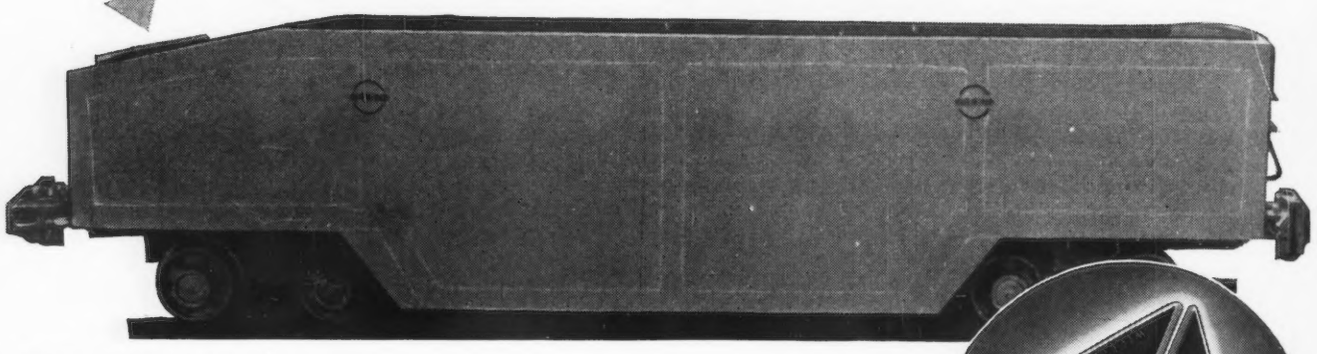
Yearly fuel costs for a Cummins-powered truck used on an off-highway haul, consisting of three 22-mile round trips per day, are $2620.00 less than the fuel costs for a gasoline-powered truck used on the same haul. That's because the Cummins-powered truck shows a daily fuel cost of $3.47 against $13.55 per day for the gas job.

Annual Savings: $1138.80

Yearly fuel costs for a Cummins-powered earth mover on a multi-million-yard earth-moving project are $1138.80 less than the fuel costs for an earth mover powered by another make of diesel and doing similar work. That's because the Cummins-powered unit, while making more trips and carrying heavier loads, uses only 25.7 gallons of fuel per shift against 33.5 gallons per shift for the other diesel.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, INDIANA

THE BIGGER THE CAR...THE BIGGER THE BENEFITS...



Photograph by courtesy of
Irwin Foundry & Mine Car Co.

WITH WILLISON *automatic* COUPLERS!

The increased handling speed of cars equipped with Willison Couplers becomes even more important as car capacities increase. Bigger cars cost more to buy and to operate—and every minute saved in car movements pays an extra dividend on your investment.

Willison Automatic Couplers are always ready to couple when brought together. Because their contours are alike, they couple instantly even though cars are reversed in position. All these add up to faster car movements, more tons per day per car.

Add to these advantages their inherent safety in operation, their rugged durability—and you have sound reasons for standardizing on Willison Automatic Couplers for any size car.

NATIONAL Products
FOR TRANSPORTATION AND INDUSTRY
Est. 1868

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY
CLEVELAND, OHIO

WILLISON AUTOMATIC COUPLERS • NACO STEEL WHEELS • NACO STEEL LINKS AND SWIVEL HITCHINGS

BJ Pneumatic Sponge

'mops up' mixed solids and liquids

THIS AIR-MOTOR CENTRIFUGAL PUMP accomplishes rugged work without absorbing a lot of punishment. Designed for "mopping up" liquids containing a high percentage of abrasive solids, it passes sand, silt, and small gravel with minimum wear...Used in mine shafts, cofferdams, caissons, bilges, manholes, etc.

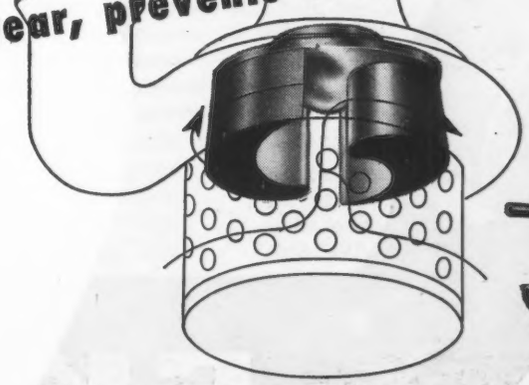
THIS COMPACT, PORTABLE Pneumatic Sponge operates in any position. A rotary air-motor, equipped with a governor and variable speed control, operates on compressed air at 70 to 100 psi. Write for bulletin and engineering information.

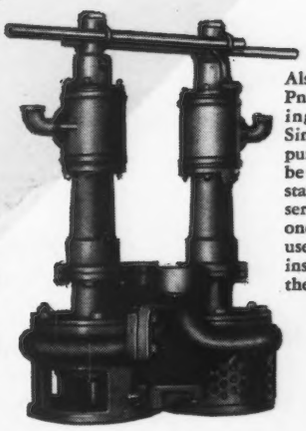
THREE TYPES AVAILABLE (Performance data for operation at 90 psi)

SIZE AND TYPE	CAPACITY	HEAD
2½" Single-Stage Sponge	25 to 125 gpm	50 to 160 ft.
2½" Double Stage Sponge	25 to 100 gpm	130 to 300 ft.
3" Single-Stage, Low-Head Sponge	120 to 300 gpm	25 to 57 ft.

circle S runner

reduces wear, prevents clogging





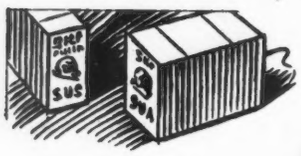
Also available as a two-stage Pneumatic Sponge for pumping-heads up to 300 feet. Since each stage is a complete pumping unit, this pump can be separated into two single-stage pumps for lower head service . . . to do two jobs at one time. To double capacity, use the pumps in series. Or to insure constant operation, use the two pumps in parallel.

Byron Jackson Co.

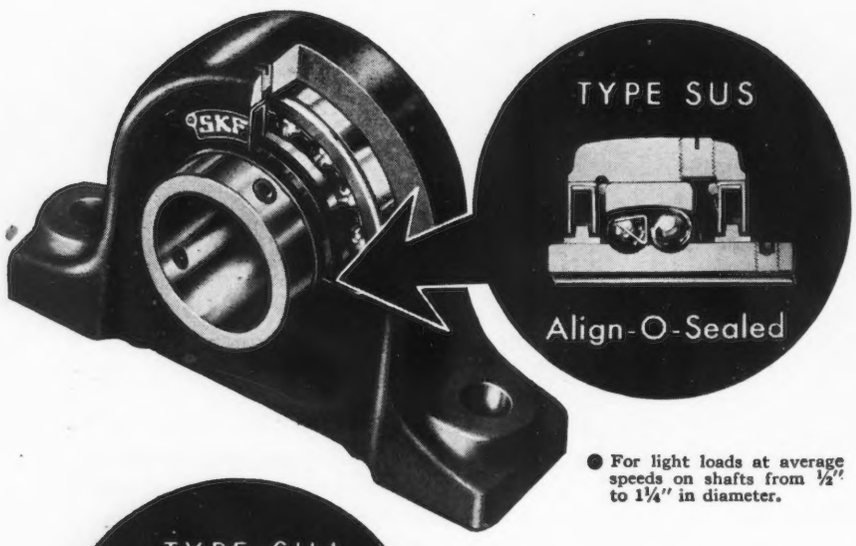
Established 1872

LOS ANGELES 54, CALIFORNIA

Offices in Principal Cities



Packaged READY TO GO!



● For light loads at average speeds on shafts from ½" to 1¼" in diameter.

● For shafts from 1 7/16" to 2 7/16" in diameter which are required to carry heavier loads than SUS units. Adapter mounting. TYPE SUAR —Same pillow block with spherical roller bearings.

Meet the youngest members of the SKF family of pillow blocks: SUS and SUA, both unit type pillow blocks. They come to you completely assembled, ready for quick installation.

Having self-aligning ball bearings, they automatically compensate for misalignment and shaft deflections without binding, insuring equal load distribution.

Their exclusive Align-O-Seals—with their close, leakproof fit—keep the bearings safe from lubricant leakage and the intrusion of dust, dirt and moisture.

SKF Bearings and their Pillow Blocks are manufactured under the closest precision control. When brought together, they fit like a glove.

6506

SKF INDUSTRIES, INC.
PHILADELPHIA 32, PA.

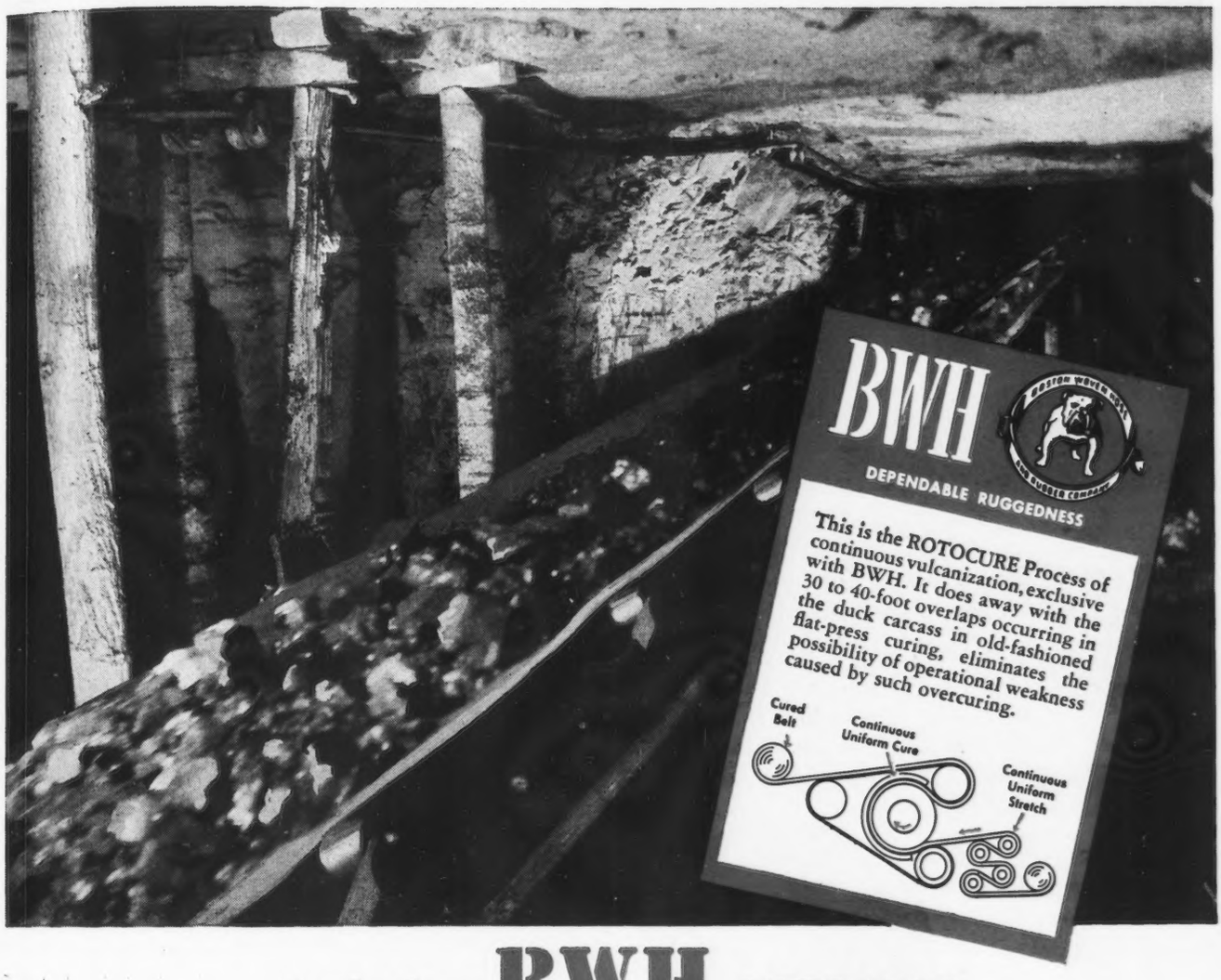
THE EXCLUSIVE SKF ALIGN-O-SEAL

A ring rotates with the shaft and within the U-shaped section of a circular cover. In the inside wall of the cover, facing the bearing, are evenly spaced holes which act as relief valves for excess grease. Overgreasing of the bearing is automatically relieved through these holes.

● *Send for Catalog 280, second edition.*

● *For replacement pillow blocks, consult your nearest Authorized SKF Distributor.*

SKF
PILLOW BLOCKS


BWH
DEPENDABLE RUGGEDNESS
This is the ROTOCURE Process of continuous vulcanization, exclusive with BWH. It does away with the 30 to 40-foot overlaps occurring in the duck carcass in old-fashioned flat-press curing, eliminates the possibility of operational weakness caused by such overcuring.
Cured Belt
Continuous Uniform Cure
Continuous Uniform Stretch

Exclusive BWH ROTOCURE Process of Continuous Vulcanization means continuous, trouble-free operation

Yes, all types of industry have discovered this fact . . . BWH ROTOCURE Belts do an outstanding job. And the record made by this Pennsylvania coal mine conveyor is a typical example of their performance. It's a veteran of many years' service through dark, dank tunnels. It has lugged giant, cumbersome cargoes at gratifying low per-ton costs. And it's still carrying on today.

One reason for such long, distinguished service is the special BWH process which inhibits mildew. But it's the exclusive BWH ROTOCURE Process of continuous vulcanization which accounts for the extraordinary stamina not only of this belt, but of all BWH belts.

What is ROTOCURE? It's a process developed by BWH technologists to produce conveyor belts that are 4-ways better, because:

1. ROTOCURE eliminates the press overlaps which occur in the duck carcass every 30 to 40 feet in belts made in flat press. Scientific tests prove such overlaps may reduce flex life as much as 40%.
2. ROTOCURE eliminates mechanical distortion, often occurring at press ends in flat-press curing.
3. ROTOCURE eliminates uneven stretch, because this method maintains constant, uniform stretch control throughout the curing process.
4. ROTOCURE eliminates overcure caused by press overlaps in rubber covers of conveyor belts and makes the covers uniformly abrasion resistant.

☆ ☆ ☆

HAVE YOU A JOB WHERE STAMINA COUNTS? Bring us your toughest problems. We're specialists in solving them. Consult your nearest BWH distributor or write to us direct.

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

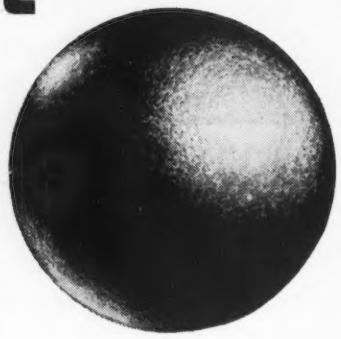
Distributors in all principal cities

PLANT: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

GOTHIC ARMOR

Gothic Armor is indicative of the best days of armor craftsmanship, in the 15th Century, A. D. The many parts were hammered out over variously shaped "stakes" of iron . . . with the help of forge and anvil. Special attention was given to forming surfaces that a weapon would slide off, rather than stick into. Its beauty was obtained by smooth, clean, finely burnished surfaces.

FORGED to a PURPOSE



Like Gothic Armor . . . CF&I Grinding Balls are forged to a purpose. They are hot-forged of tough, abrasion - resisting steel, carefully heat treated for uniform wearing qualities. Maximum, uniform recovery in any ore-milling process requires a consistently correct grind. This is largely dependent upon the grinding medium. CF&I Grinding Balls are round and *stay* round, thus through their long life provide maximum grinding surface for the most effective and *uniform* grinding.

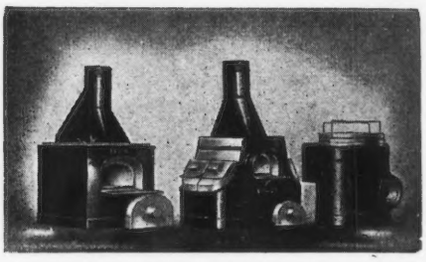
OTHER CF&I PRODUCTS FOR THE MINING INDUSTRY

WICKWIRE ROPE, GRINDING RODS, INDUSTRIAL SCREENS, MINE RAILS AND FASTENINGS, REALOCK FENCE, CLINTON WELDED WIRE FABRIC.

CF&I FORGED STEEL GRINDING BALLS
The Colorado Fuel and Iron Corporation
General Offices: Denver, Colorado
PACIFIC COAST SALES — THE CALIFORNIA WIRE CLOTH CORPORATION — OAKLAND, CALIFORNIA

CF&I & SUBSIDIARIES

Assay Laboratory FURNACES



MUFFLE COMBINATION MELTING

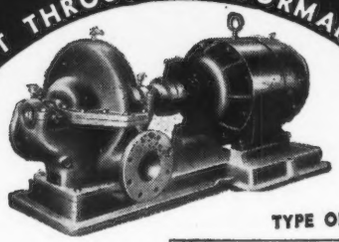
A complete line of sturdy, dependable lightweight Muffle, Combination and Bullion Melting Furnaces for assay and metallurgical laboratories, for operation with:

Braun Cary Gasoline Burners
Braun Vesta Oil Burners
Braun Propane Burners
Braun Gas Burners

Address Dept. E-12, for a copy of Bulletin C-107.

BRAUN CORPORATION
2260 EAST 15TH ST., LOS ANGELES 21, CALIF.
BRAUN-KNECHT-HEIMANN-CO. San Francisco, California
BRAUN
SCIENTIFIC SUPPLIES CO. Seattle, Washington

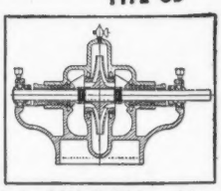
Another Great PUMP "by Aurora"
WINS RESPECT THROUGH PERFORMANCE
DOUBLE SUCTION



TYPE OD

AURORA CENTRIFUGALS
for Every Pumping Job
HORIZONTAL SPLIT CASE
Single & Two Stage
SIDE SUCTION
VERTICAL
NON CLOG
SUMP
MIXED FLOW
SPECIAL DESIGN
Write for
CONDENSED CATALOG "M"
or
Consult SWEETS

AURORA HORIZONTALLY SPLIT CASE DOUBLE SUCTION SINGLE STAGE CENTRIFUGAL PUMPS



Available in capacities to 4,000 G.P.M. and heads to 300 ft., these accessible, compact, and lasting Type OD Pumps are widely used for general water supply, for municipalities, industrial plants, office buildings, institutions. Also for handling condenser circulating water, wash water, liquids in paper mills and distilleries, chemical solutions, oil in oil fields and refineries, irrigation, etc.

APCO TURBINE-TYPE PUMPS

Here's the Pump for "1001" duties. SIMPLE — only one moving part, the Impeller. Unsurpassed for low capacity, high head duties. Slight change in capacity against drastic head variations.

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS
AURORA PUMP COMPANY
86 Loucks Street, AURORA, ILLINOIS

NOW READY-
for all 8′6 and 12′6 AMERICAN DISC TYPE FILTERS

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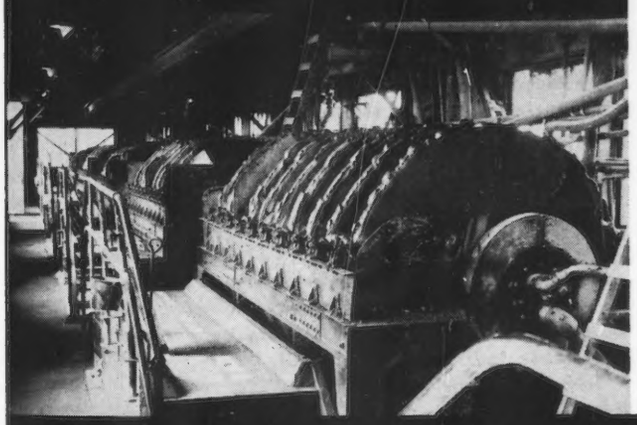

Steel but light weight! And, of course, very durable and not subject to warping or clogging. Thorough tests have established high drainage rates.

This new American All-Steel Sector is designed to replace wooden sectors for all filters on the 8′6″ and 12′6″ sizes. It is optional with wooden sectors on new filters in these two sizes. Before long we expect to have all-steel sectors for the smaller American, too.

We suggest that you order enough all-steel sectors to outfit at least one disc and check their operation against the wooden sectors. Write or call our nearest office for prices and deliveries.

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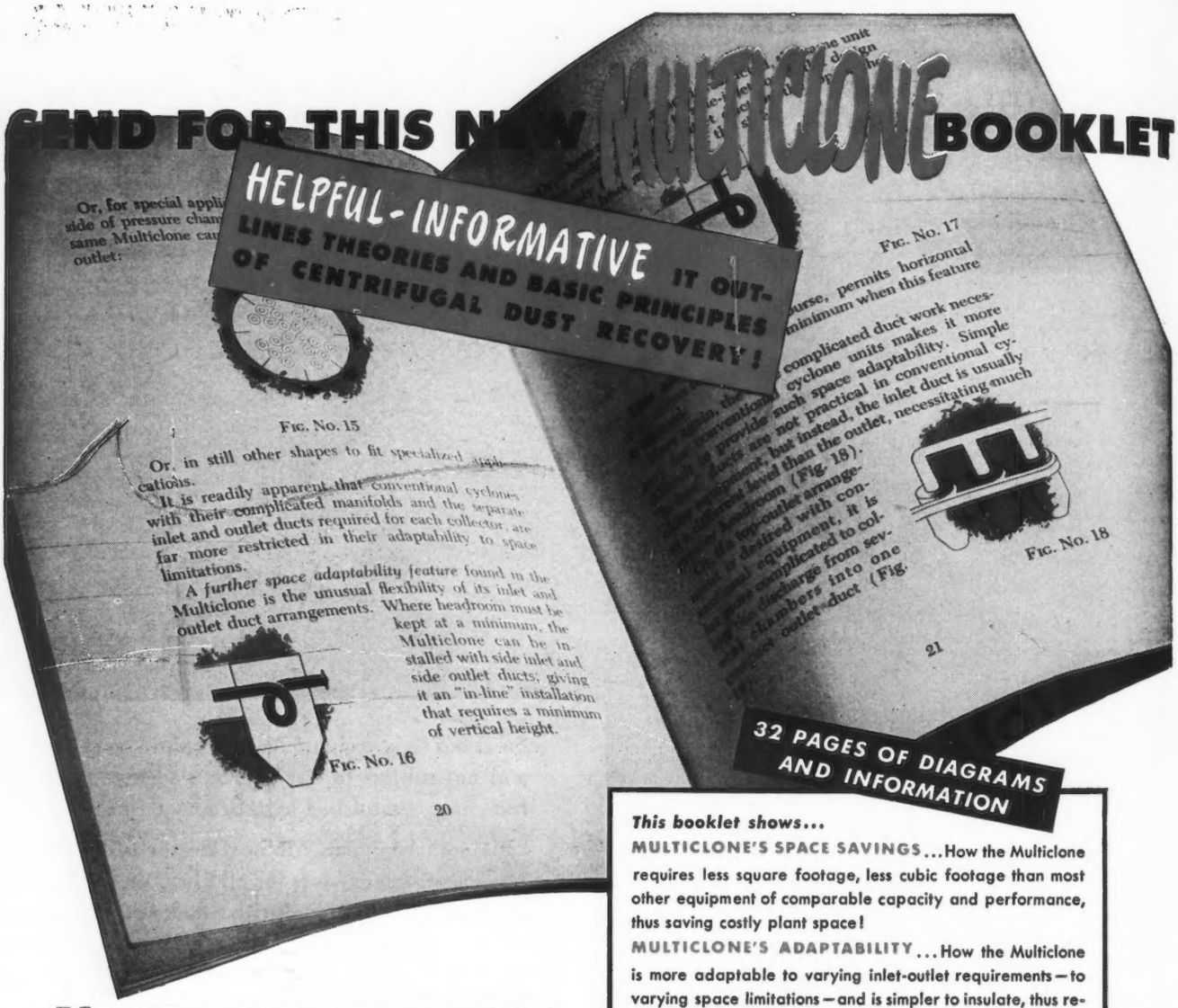
SEND FOR THIS NEW MULTICLONE BOOKLET


HELPFUL-INFORMATIVE IT OUTLINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!
FIG. No. 15
Or, in still other shapes to fit specialized applications.
It is readily apparent that conventional cyclones with their complicated manifolds and the separate inlet and outlet ducts required for each collector, are far more restricted in their adaptability to space limitations.
A further space adaptability feature found in the Multiclone is the unusual flexibility of its inlet and outlet duct arrangements. Where headroom must be kept at a minimum, the Multiclone can be installed with side inlet and side outlet ducts; giving it an "in-line" installation that requires a minimum of vertical height.
FIG. No. 16
20
FIG. No. 17
FIG. No. 18
21
32 PAGES OF DIAGRAMS AND INFORMATION

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet just published that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE'S unique *vane* design is fundamentally different... how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

This booklet shows...

MULTICLONE'S SPACE SAVINGS... How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

MULTICLONE'S ADAPTABILITY... How the Multiclone is more adaptable to varying inlet-outlet requirements—to varying space limitations—and is simpler to insulate, thus reducing installation costs!

MULTICLONE'S EFFICIENCY... How Multiclone's multiple *small diameter* tubes, made possible by its exclusive *vane* design, give higher centrifugal forces and more complete cleansing of *all* suspended particles—even small ones of 10 microns and less!

MULTICLONE'S LOW MAINTENANCE... How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

Make sure that a copy of this new booklet is in your reference files by sending for your copy now!

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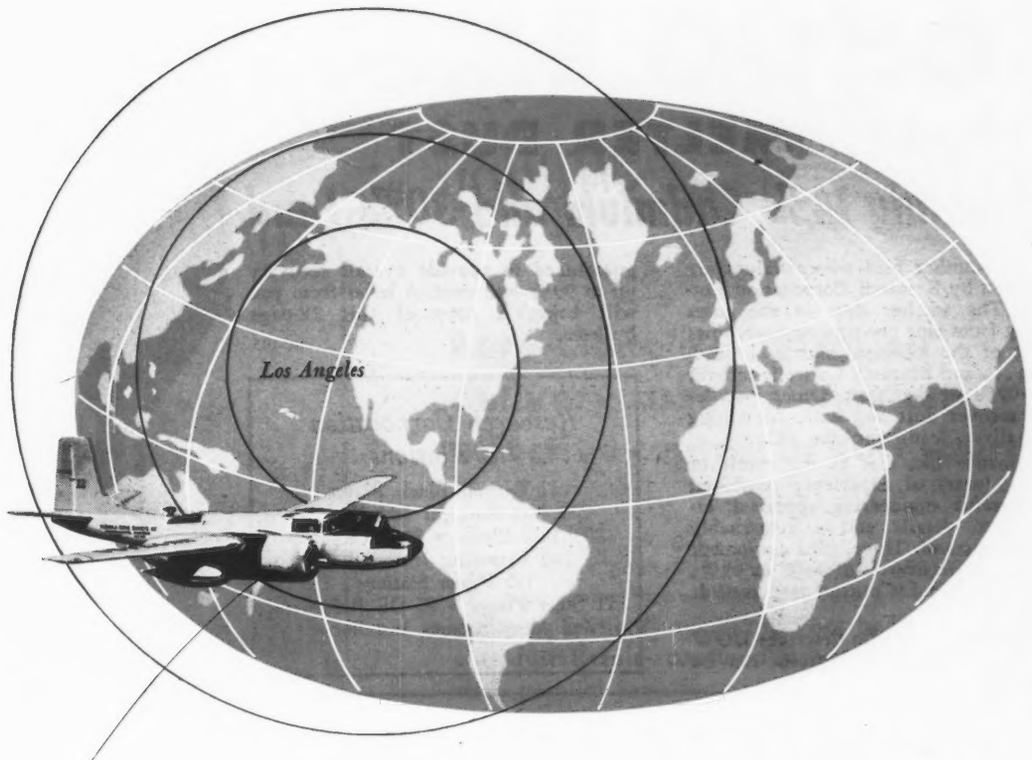

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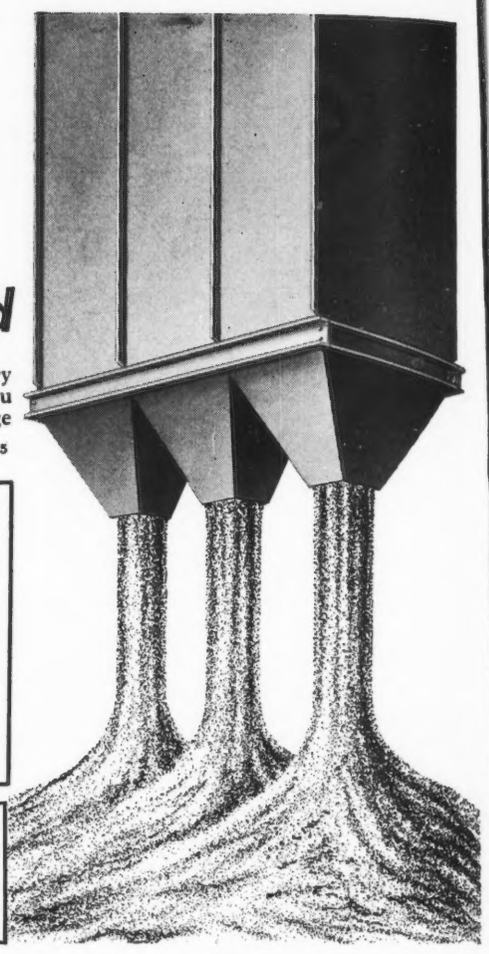
containing 14% Cadmium and 30% Lead



Here is another case where values are recovered by Research Corporation Cottrells. The smelter dust in the gases coming from zinc ore sintering machines is one of the principal sources of cadmium . . . and Research Cottrells recover 90%-99% of that dust. Other installations recover dust and fume containing gold, silver, lead, zinc, tin, etc.

Performance like this is the result of over 35 years of experience combined with careful engineering appraisal, attention to details and a remarkably efficient method. These, plus equipment which gives recoveries of 90% to 99%, are responsible for outstanding records of recovery.

An informative bulletin describes HOW and WHY Research Cottrells can be guaranteed to provide overall recovery up to 99% and over. A letter from you will bring a copy of this 28-page bulletin.

RC-105

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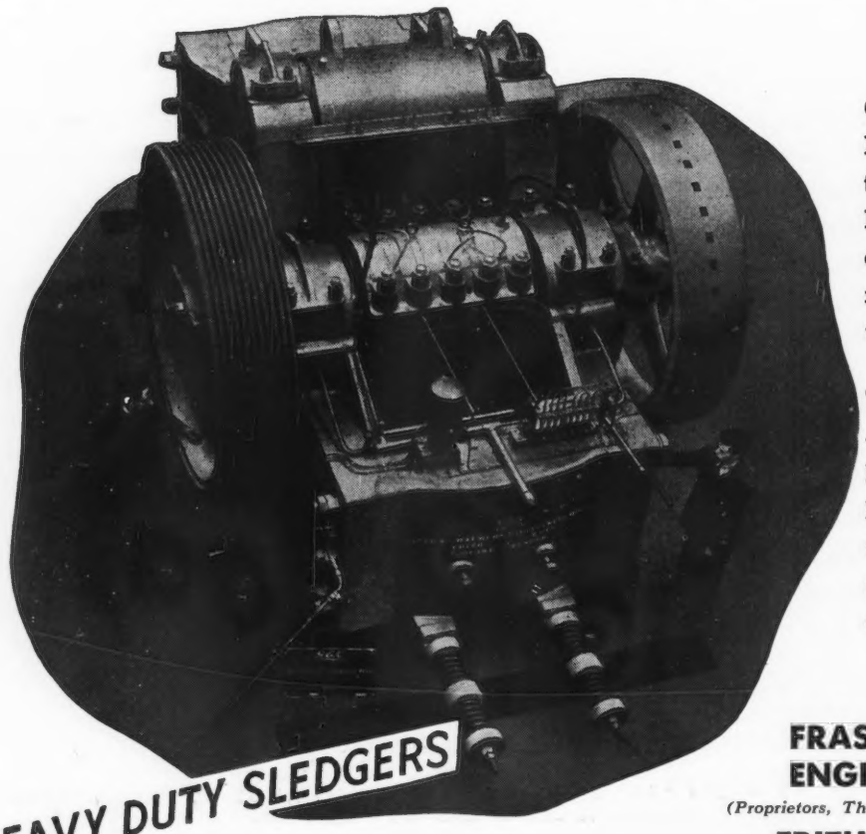


One of a number of Heavy Duty Sledgers being manufactured by Fraser & Chalmers. F. & C. Heavy Duty Sledgers are designed to crush run-of-mine ore, capacities 200/800 tons per hour.

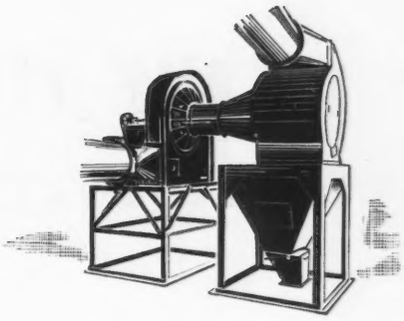
These are massive machines — equipped with automatic lubrication and water cooled bearings—specially designed to meet the demand for large outputs required by mines and quarries.

FRASER & CHALMERS ENGINEERING WORKS

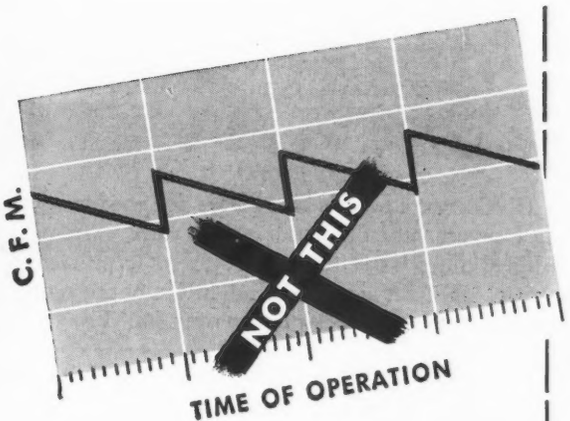
(Proprietors, The General Electric Co. Ltd. of England)

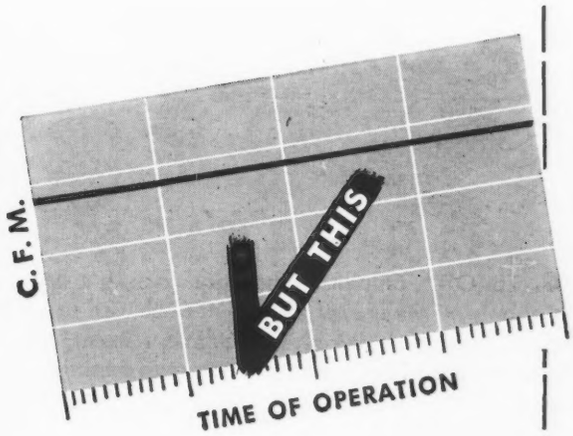
ERITH, KENT, ENGLAND

Continuous dust control demands constant air volume



Roto-Clone's uniform air delivery assures constant effective control at dust source





THE two charts at left tell an important story. The one above shows how rapidly air volume declines as ordinary type collectors become clogged with dust. Result—constantly varying exhaust volume with parallel variations in effectiveness of control at point of dust generation.

Now examine the chart below. This is a Roto-Clone* at work. Constant air volume is exhausted hour after hour, day in and day out. Continuous high efficiency dust collection is assured without a minute's time out for unit maintenance.

The Roto-Clone method of dust control applies centrifugal and dynamic forces in combination to remove the dust particles from the air stream. There are no collecting elements to clog or clean. Dust is discharged automatically for easy removal without interference to operation.

If you want to put dust control on a continuous high efficiency basis, you will want to put Roto-Clone with its small space requirements on the job. There's a type and size for every service. For complete information, contact your local AAF representative or write direct for copy of Bulletin No. 270-A.

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precicipitator types.*

AMERICAN AIR FILTER CO., INC.
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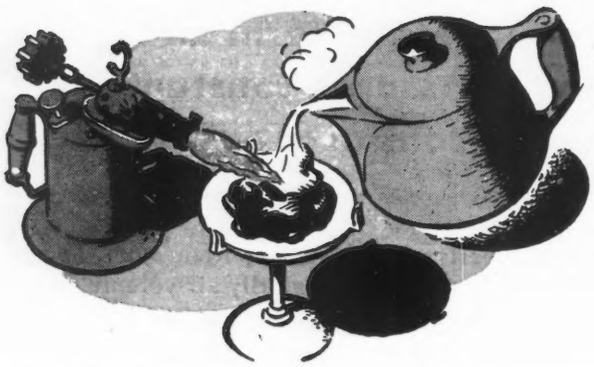
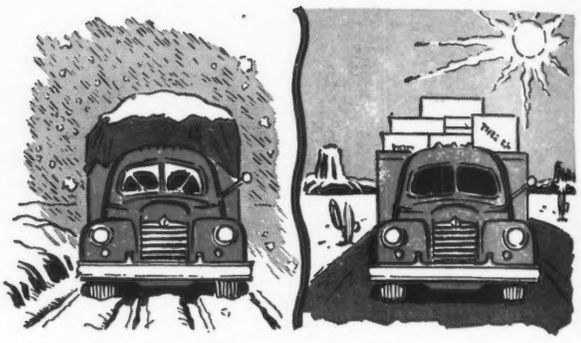
ROTO-CLONE®
DUST CONTROL EQUIPMENT

SAVE TIME and MONEY with SIMPLIFIED UNOBA LUBRICATION!



1. UNOBA is the first all-purpose grease in history that resists *both* heat and water. That's why this one grease performs the jobs that formerly required many different types, grades and brands of greases!



2. UNOBA is a barium base grease designed to withstand severe moisture and temperature extremes. Neither boiling water nor dry heat can cut its protective coating! UNOBA gives thorough lubricant protection at below-freezing temperatures to over 300° F.

3. UNOBA's unusual adhesiveness to metal gives maximum protection against rust and corrosion. It maintains excellent grease structure under severe mechanical working and does not deteriorate in storage.

4. UNOBA simplifies lubrication to such a degree that only *one gun* and *one container* need be used in most cases! Thus UNOBA saves you time, reduces equipment costs and holds stock inventory to a minimum.

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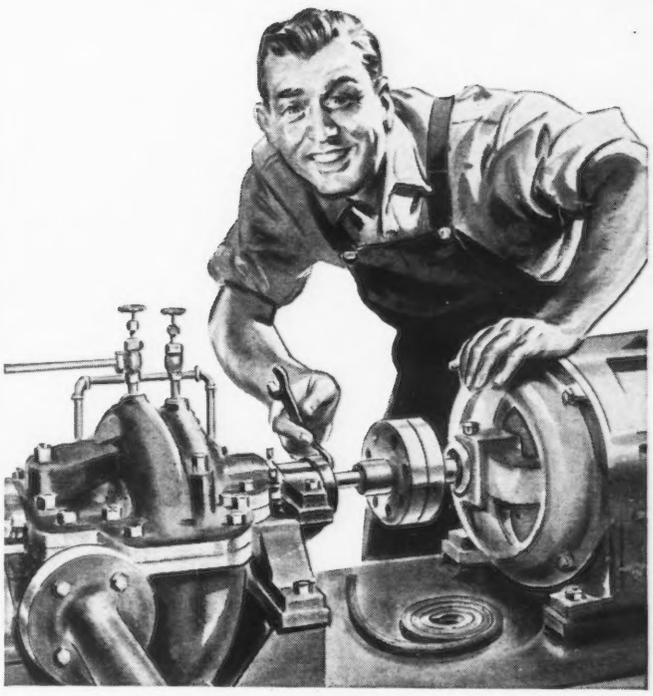

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GARLOCK 732 patented Lattice-Braid—with wire

FOR MINERAL ACIDS

GARLOCK 736 patented Lattice-Braid—blue asbestos
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NEW ADVERTISEMENTS received by 10 A.M. December 16th will appear in the issue of January, subject to limitations of space available.

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NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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ENGINEERS: Large college offers $3000, approx. half time teaching-studying. All ranks univ. positions, experienced $4500-$6500 nine months. Give phone, photo, qualifications. Cline Teachers Agency, East Lansing, Mich.

WANTED: UNDERGROUND superintendent. Technical graduate. Thirty-five to forty years old. Must have at least five years practical underground operating experience. Prefer man from the southwest. Salary, $400.00 to start. In reply give complete details of experience and references. P-7006, Engineering & Mining Jl.

WANTED: ANALYTICAL Chemist experienced in non-ferrous metals analysis; New York area. P-7175, Engineering & Mining Jl.

DEVELOPMENT ENGINEER—To do engineering development work on mechanics of non-ferrous metallurgical processes. Extrusion, wire drawing, etc. Excellent opportunity with large nationwide corporation. New Jersey. Up to $500. Must have good academic training and experience. Men should be between 30-40 in excellent health. P-7016, Engineering & Mining Jl.

THE ANGLO American Corporation of South Africa Limited requires an Assistant Consulting Metallurgist to reside in Northern Rhodesia for work on base metal problems, including copper, zinc, lead, cobalt and vanadium. Good qualifications and experience essential. Age not over 45. Applications, giving full particulars, should be addressed to Mr. W. E. Groves, at the Corporation's London Office, 11 Old Jewry, E.C. 2, England.

JUNIOR MINE Engineers. Recent college graduates, competent as undeground surveyors, and draftsmen. Standard three-year contract. Starting basic salary $2700 a year plus yearly bonus one month. Single. Transportation furnished to Bolivia by air for employee. Four weeks vacation yearly plus free living quarters. P-7015, Engineering & Mining Jl.

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MINING ENGINEER: 45, married, no children. Desires position as Mine Superintendent or General Mine Foreman. Experienced in most underground mining methods and milling. Speak Spanish. Good references. Available reasonable notice. PW-6951, Engineering & Mining Jl.

YOUNG MAN—30, unmarried. Competent in mining administration. Experience: bookkeeping, costing, correspondence. Seeks new connection with opportunity anywhere in U. S. PW-7100, Engineering & Mining Jl.

MINE SUPERINTENDENT, Mine Foreman, desires change, domestic or foreign location. Familiar with underground and Surface Mining methods. Fully experienced most every form of stoping, including heavy ground. Consider position with developed or undeveloped mining company. Welcome difficult problems. Latin American experience. Speak Spanish. Technical background. Age, 44. Best of references. PW-7047, Engineering & Mining Jl.

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There are FOUR known veins from three feet to fifteen feet average widths, free milling oxidized gold ore. There are now FIFTY-FOUR THOUSAND TONS of ore averaging TWELVE DOLLARS GOLD PER TON AND ONE DOLLAR FIFTY CENTS IN SILVER.

There is a 35-ton stamp mill with cyanide plant and Merril-Crewe precipitation plant. Also complete assay office. Also a 100 (one hundred kilowatt) Hydro-electric plant. Also houses for staff and labor.

There is a dry season automobile road from the Capital, Managua, to the mine, about one hundred miles distant. There is also an airport for large planes 10 miles distant with service twice per week. The whole property, company and concession can be bought for ONE HUNDRED SIXTY THOUSAND DOLLARS.

This opportunity open for only FOUR MONTHS.

***Address* J. A. WILLEY**

Santo Domingo, Chentales, Nicaragua

BY AIR MAIL

FOR SALE

TWO-UNIT ZINC-LEAD CONCENTRATE FLOTATION PLANT

No. 1, 200 and No. 2, 50 tons per 24 hours. Zinc-Lead Wet Jig Mill Unit, 1,000 tons per 24 hours. Designed for treatment Tailings, but readily adaptable to regular milling plant.

All machinery complete with electric motors. Recently overhauled condition. Frame buildings. Miscellaneous extra items including pumps, pipe, motors, etc. Will not sell individual machinery units.

The J. C. McClintock Company
1206 Bassett Tower, El Paso, Texas

WANTED

Large engineering firm wishes to acquire several complete plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible, strictest confidence. *Box 1231, 1474 Broadway, New York 18, N. Y.*

When Writing Your Ad

Provide an indexing or subject word.

Write it as the first word of your ad.

If it is a Position Wanted or Position Vacant ad, make the first word the kind of position sought or offered.

This will assure proper classification in the column.

The right is reserved to reject, revise or properly classify all Want Advertisements.

Proper Classification

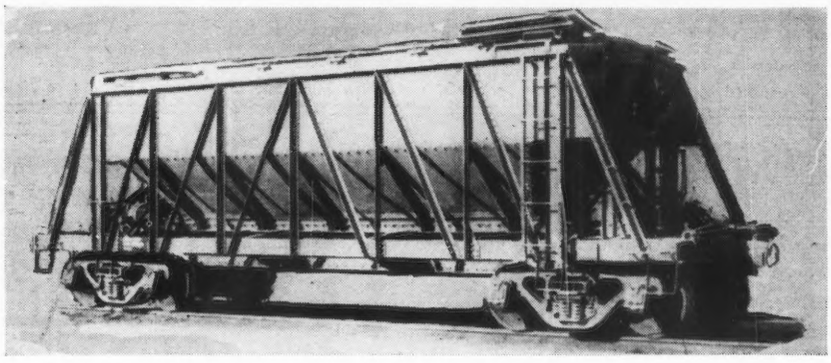
increases the possibility of

Prompt Returns

50 —FOR SALE— -50 TON CAPACITY COVERED CONCENTRATE HOPPER CARS

Load Limit:
121,900 lbs.

Built 1929



Cubical Capacity:
1021 Cu. Ft.

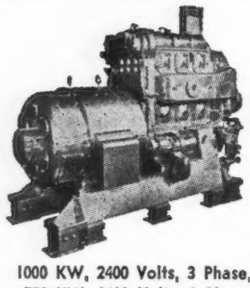
All equipped with Vulcan Cast Steel Side Frames, Cast Steel Bolsters, Steel Wheels, 6"x8" Couplers with Cross Key Attachment. 36 equipped with AB brakes—14 equipped with K brakes.

WIRE — WRITE — or TELEPHONE: BAyport 1-3456

IRON & STEEL PRODUCTS, INC.

FOUNDED 1930 — 13476 S. BRAINARD AVE., CHICAGO 33, ILLINOIS

***"ANYTHING* containing IRON or STEEL"**



DIESEL GENERATOR PLANTS FOR *IMMEDIATE DELIVERY*

HEMCo

1000 KW, 2400 Volts, 3 Phase, 60 Cycle, 720 RPM, General Motors Model 16-278A
750 KW, 2400 Volts, 3 Phase, 60 Cycle, 720 RPM, General Motors Model 12-567
600 KW, 2400 Volts, 3 Phase, 60 Cycle, 1200 RPM, General Motors Model 8-268A
300 KW, 450/2400 Volts, 3 Phase, 60 Cycle, 1200 RPM, General Motors Model 8-268A
200 KW, 450/2400 Volts, 3 Phase, 60 Cycle, 1200 RPM, General Motors Model 8268A
50 KW, 440 Volts, 3 Phase, 60 Cycle, 900 RPM, airbanks-Morse Model 36A 5½
100 KW, 3 Wire, 125/250 Volts DC, 1200 RPM, General Motors Model 3-268A
900 HP, General Motors Model 12-567, Propulsion Unit Complete

HERCULES ELECTRIC MACHINERY and EQUIPMENT CO.

Tel. NEvada 6-2808—Cable Address HEMCOY 1412-18 So. Alameda St., Compton, Calif.

LOCOMOTIVES FOR SALE

2—65 ton, WHITCOMB diesel-electric, new 1943, 566 HP, tractive effort 43,300#.
1—45 ton, DAVENPORT diesel-electric, new 1942, four traction motors, railway type, Cooper Bessemer diesel unit, rear end cab.
1—44 ton, GENERAL ELECTRIC diesel-electric, built new October, 1944, 380 HP, four traction motors, Caterpillar D-17000 diesel units.
1—35 ton, PLYMOUTH diesel-mechanical, powered by Cummins Model L1-600 unit, excellent condition.
1—25 ton, GENERAL ELECTRIC diesel-electric, new 1942, powered by Cummins Model HB1-600 unit, one traction motor, tractive effort 16,000#.
2—50 ton, PORTER steam side tank type switching locomotives, new in 1943, pressure 210#, tractive effort 21,600#.
2—80 ton, LIMA type 0-6-0 steam switchers with tenders, new 1944, tractive effort 40,000#, 21"x28" cylinders.

LOCOMOTIVE CRANES

1—ORTON 15 ton capacity, new 1942, steam double drums. Excellent.
2—OHIO 35 ton capacity, new 1943, gasoline powered, 60' booms, double drums outriggers.
1—OHIO 35 ton Model G, new 1942, steam operated, coal fired, 55' boom, double drums, outriggers.

CARS

4—20 cu. yd capacity Austin Western air dump cars, cast steel truck side frames, will interchange.
16—50 ton capacity twin hopper cars, all steel, class "HD," all standard accessories, will interchange.
40—All steel 30 ton capacity gondolas, new in 1945. Cast steel truck side frames, will interchange.

Our stock includes many other locomotives, cars, cranes and heavy equipment items.
We invite your inquiries.

Write — Phone — Wire

PAN-AMERICAN ENGINEERING CO.

P.O. Box 2576 Telephone L.D. 339
Dallas, Texas

COMPRESSORS

NEW AND REBUILT SALES AND RENTAL

Stationary • Portable
Electric • Gas • Diesel • Steam
Rebuilt • Tested • Guaranteed
All Sizes • PROMPT SERVICE

AMERICAN AIR COMPRESSOR CORP.

Dell Ave. & 48th St., North Bergen, N. J.
N. Y. Phone CH 4-7665 N. J. Phone UN 5-4848

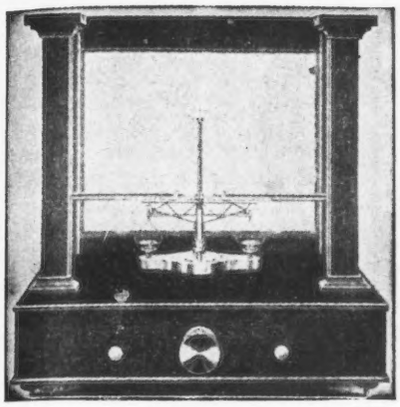
6 FT. X 48 IN. HARDINGE BALL MILL, WITH OR WITHOUT AIR SEPARATOR

#1½ STURTEVANT RING ROLL MILL.
54 IN. X 30 FT. ROTARY DRYER.
3 FT. X 5 FT. HUMMER 3 DECK SCREEN.
24 FT. X 48 IN. LINK-BELT APRON FEEDER.
40x48 BUCHANAN JAW CRUSHER.
36 IN. X 24 IN. TRAYLOR JAW CRUSHER.
70 IN. X 35 FT. RUGGLES COLES XB INDIRECT DRYER.
8 FT. & 10 FT. GAYCO AIR SEPARATORS.
45-TON PLYMOUTH DIESEL LOCOMOTIVE.

DARIEN CORPORATION

60 E. 42nd Street, New York 17, N. Y.

Mining and Concentrating Machinery
LARGE STOCK-FULLY RECONDITIONED



BALANCES

2—200 oz. Troemner Bullion Specie.
1—1000 oz. Schmoltz Bullion.
1—5000 oz. Fairbanks Bullion.
1—Ainsworth Button type VG, sens. 1/500 mg.
1—Ainsworth Button type VG, sens. 1/500 mg.
1—Thompson Analytical style No. 30, sens. 1/10 mg.
1—Denver Button style F, sens. 1/50 mg.
1—Ainsworth Button type E, sens. 1/200 mg.
1—Thompson Button No. 7, sens. 1/200 mg.
1—Ainsworth Button type G, sens. 1/100 mg.
1—Troemner No. 50 Button, sens. 1/10 mg.
1—Becker Assay, sens. 1/100 mg.
2—Ainsworth Assay, type E, sens. 1/200 mg.
1—Smith & Thompson Assay, style No. 9, sens. 1/200 mg.
1—Keller Inverted Beam Assay, sens. 1/100 mg.
2—Smith & Thompson Assay, sens. 1/200 mg.
1—Ainsworth No. 1 Assay, sens. 1/200 mg.
1—Troemner No. 3 Assay, sens. 1/50 mg.
1—Ainsworth Assay, class B, sens. 1/50 mg.
1—Thompson No. 35 Pulp, sens. 1/4 mg.

LOCOMOTIVES

2—2 to 2½ ton Mancha Battery, 18" gauge.
1—2 to 2½ ton Whitcomb Battery Locomotive, 24" gauge.
2—5 ton Jeffrey Battery, 42" gauge.
2—7 ton General Electric Permissible Type Battery Locomotive, 36" gauge.
1—7 ton Mancha Battery, 36" gauge.
3—6½ ton General Electric Trolley Locomotives, 36" gauge.
1—5" x 10" Porter Compresser Air Locomotive, 18" gauge.
1—5½" x 10" Baldwin Compressod Air Locomotive, 30" gauge.
1—3 ton Whitcomb Gasoline Driven Locomotive, 24" gauge.
1—3 ton Ruth Gasoline Driven Locomotive, 18" gauge.
1—50 ton Brooks Steam Locomotive with Tender, 36" gauge.
2—18 ton Davenport Steam Locomotives, 1-36" gauge, 1 standard gauge.

ORE CARS

1—12 cu. ft. Rocker Dump, 18" gauge.
3—18 cu. ft. Rocker Dumps, 18" gauge.
6—23 cu. ft. Rocker Dumps, 18" gauge.
2—20 cu. ft. Rocker Dumps, 24" gauge.
3—34 cu. ft. Rocker Dumps, 18" gauge.
3—55 cu. ft. Rocker Dumps, 30" gauge.
12—84 cu. ft. Rocker Dumps, 36" gauge.
6—2 cu. yd. Koppel Rocker Dumps, 36" gauge.
1—14.3 cu. yd. Koppel Rocker Dump, 36".
1—14.3 cu. ft. End Dump, 18" gauge.
3—14 cu. ft. Gable bottom, 18" gauge.
1—4 cu. yd. Austin-Western 2-way Side Dump, 24" gauge.

MORSE BROS. MACHINERY CO. 50th ANNIVERSARY 1898·1948

PUMPS

1—2" Wilfley Sand Pump.
1—3" x 3" Allen-Sherman-Hoff Rubber Lined Hydro-seal Pump.
1—3" Telluride Centrifugal Sand Pump.
1—4" Traylor Centrifugal Sand Pump.
2—6" Wilfley Sand Pumps.
2—4" Butchart Diaphragm Pumps.
1—No. 4 Dorrco Diaphragm, acid proof.
5—1" New Ingersoll-Rand Motor Pumps.
8—1" New Pacific Monobloc Pumps.
1—1¼" Ingersoll-Rand Motor Pump.
7—3" Ing.-Rand Motor Pumps, bronze fitted
1—1" Buffalo Centrifugal Pump.
10—1¼" New Goulds Centrifugal Pumps mounted on adjustable base with 1½ HP Westinghouse motors.
125—1½" New Deming Centrifugal Pumps with 1½ HP General Electric motors and adjustable bases.
1—2" Worthington Centrifugal Pump.
1—2½" Ingersoll-Rand Centrifugal Pump, 300' head, 300 gallon per minute, mounted on common base and direct connected to 40 HP Gen. Elec. motor.
1—3" Goulds Centrifugal Pump.
1—4" Byron Jackson Centrifugal Pump.
1—6" Goulds Centrifugal Pump.
1—7" Fairbanks Morse Centrifugal Pump.
1—8" Fairbanks Morse Centrifugal Pump.
1—10" Morris Centrifugal Pump.
1—12" Morris Centrifugal Pump.
4—2½" 4-stage Pennsylvania Centrifugals.
4—3" 6-stage United Centrifugal Pumps.
1—2½" Krogh Centrifugal Sinking Pump.
17—2" New Jaeger Portable Self-Priming Pumps, direct connected to 2½ HP. Wisconsin air-cooled gasoline engines.
2—2½" x 1½" Economy 4-stage Pumps, direct driven by 59 HP Chrysler Industrial engines.
101—¾" New Blackmer Rotary Hand.
33—1" New Blackmer Rotary Hand Pumps.
1—4" x 5" Deming Horizontal Simplex Piston Pump.
1—4" x 6" Fairbanks-Morse Duplex Piston Pump.
1—2½" x 6" Goulds Vertical Triplex.
1—5¼" x 3½" x 5" Fairbanks Morse Duplex Steam Pump.
2—4 x 4 x 2¾" Ingersoll-Rand Vacuum.

SHOVEL LOADERS

3—Elmco rocker shovels, model 12B.
4—Goodman 'Conway" mucking machines, type 50A.

JAW CRUSHERS

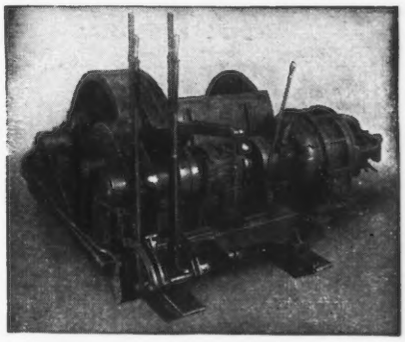
1—4" x 6" Massco "Ideal" Laboratory Jaw Crusher.
1—8" x 8" Universal semi-steel crusher.
1—8" x 24" Rogers cast steel crusher.
1—9" x 16" Cedar Rapids All Steel Crusher.
1—8" x 36" Universal all steel crusher.
1—15" x 20" Universal All Steel Crusher.
1—24" x 36" Traylor type A Blake crusher.

SYMONS CONE CRUSHER

1—3' Symons Cone Crusher, fine cone.

GYRATORY CRUSHERS

1—36 Kennedy-VanSaun roller bearing.
1—37 Kennedy-VanSaun type S roller bearing fine reduction crusher.
1—10" Traylor "Bulldog" type T crusher.



ELECTRIC HOISTS

2—10 HP Boxco single drum.
1—15 HP new Morse Bros. single drum.
1—20 HP H & B single drum.
1—22 HP Vulcan No. 1½, double drum.
2—35 HP Vulcan No. 22C, single drum.
1—37 HP single drum.
1—50 HP Fairbanks-Morse single drum.
1—50 HP English Iron Works, single drum.
3—52 HP Vulcan No. 4½, single drum.
1—60 HP Vulcan No. 23-ELF, wide single drum.
1—150 HP single drum.
1—300 HP Ottumwa double cylindro-conical drum.

STEAM HOISTS

1—9" x 10" American, 3 drum, double cylinder, tandem drums.
1—10" x 14" single drum, 100 HP.

CONTRACTORS TYPE HOISTS

1—3 tandem drum Thomas, 80 HP.
1—3 tandem drum Lidgerwood, 80 HP.
1—3 tandem drum Clyde Iron Wks., 80 HP.

GASOLINE DRIVEN HOISTS

1—15 HP OK Clutch & Machy. Co., 2-drum.
1—25 HP Construction Machinery Co., 2 drum driven by 31 HP Continental.

AIR TUGGER HOISTS

35—size EU Ingersoll-Rand standard "utility" air hoists.
1—68C Ing.-Rand little tugger air hoist.

ELECTRIC TUGGER HOISTS

3—6½ HP Sullivan single drum, 250 volt DC.
9—6½ HP Sullivan dbls. dr. 250 v. DC.
1—25 HP, model B-211, Sullivan 2 drum slusher hoist, 440 volt.

BALL AND ROD MILLS

1—3' x 8' Denver Engr. Co. Tube Mill, approx. wt. 12,000 lbs.
1—3' x 9' Ruth Open End Rod Mill, approx. wt. 16,750 lbs.
1—4' x 11' Ruth Open End Rod Mill, approx. wt. 31,000 lbs.
1—4' x 4' New Colorado Iron Works Ball Mill, complete with hard iron liners, approx. wt. 15,000 lbs.
1—5' x 22" Hardinge Conical Ball Mill, approx. wt. 19,000 lbs.
1—6' x 36" Hardinge Conical Ball Mill.
1—6' x 8' Marcy Cast Iron Ball Mill, approx. wt. 60,000 lbs.
1—8' x 22' Hardinge Conical Pebble Mill,

FILTERS

1—3' x 4' Oliver Continuous Drum Filter.
1—6' x 3—Disc American Continuous Disc.
1—6' x 4—Disc American Continuous Disc.
1—18" New Morse Bros. Round Pattern Filter Press.

BLOWERS

16—Type HS New Amer. Vol., 12,000 CFM, direct driven by 7 to 12½ HP Wagner mtrs., 440 v.
21—Type HS New Amer. Vol., 12,000 CFM, direct driven by 12½ HP G. E. DC mtrs. (6 to 115 v. mtrs., 15 with 230 v. mtrs.)

SEND FOR NEW RECONDITIONED STOCK LIST BULLETIN NO. 481.

REBUILDERS OF MINING AND CONCENTRATING MACHINERY SINCE 1898

BETTER MACHINERY—IT'S FULLY RECONDITIONED

ESTABLISHED 1898

MB

MORSE BROS. MACHINERY CO.

P.O. BOX 1708 DENVER, COLORADO, U.S.A. CABLE "MORSE"

GENERAL OFFICE AND PLANT 2900 BROADWAY, DENVER, COLORADO

COMPLETE ORE-MILLING PLANTS · CONCENTRATION · FLOTATION · MACHINERY · CYANIDE · AMALGAMATION

SLUSHER HOISTS
1—3 Drum Ingersoll-Rand Electric Slusher Hoist, with Two 1½ Yd. Crescent Scrapers.

GENERATORS
3—D-13000 Caterpillar, 75 KW—AC.
1—D-13000 Caterpillar Power Unit with spare 75 KW Generator.

PUMPS—HYDROSEAL
1—2″ Allen-Sherman-Hoff, Rubber Lined, B.D.
3—6″ Allen-Sherman-Hoff, Rubber Lined, with 20 HP Motors.
1—8″ Allen-Sherman-Hoff, Rubber Lined, with 40 HP Motor.

THICKENERS
1—20′ x 8′ Dorr—Steel Tank.
1—20′ x 8′ Dorr—Fir Tank.
1—20′ x 8′ Booth-Thompson—Fir Tank.

CLASSIFIERS
1—6′ x 22′ Dorr Duplex.
1—45″ Akins High Weir-Spiral.
1—60″ x 23′ Denver Simplex Cross-Flow.

REAGENT FEEDERS
1—Geary, Jr., 2-Bucket, with Motor.
14—Clarkson Model E (wet), with Motors.
1—Denver Equip. (wet), single compartment.
1—24″ Cone Type Denver Equip. (dry), with Motor.
1—Jeffrey-Traylor, Vibrator Type.

FILTERS—DISC
2—4′, 6-Disc Eimco Filters.

AGITATORS
3—10′ x 9′ Devereaux Type Center Well, Rubber Lined.

TANKS
1—6′ x 18′ Horizontal Steel Tank.
1—8′ x 20′ Steel Bolted Tank, Open Top, Cap. 44,000 Gals.
2—20′ x 20′ Wood Stave Fine Ore Bins.

CRUSHERS
1—9″ x 40″ Austin-Western.
1—10″ x 20″ Allis-Chalmers.
1—24″ x 20″ Jeffrey Swing-Hammer Mill.

FLOTATION MACHINES
4—#24 Denver Sub-A, 8 Cell, Wood Tanks.
1—#18 Weinig Sub-A, 8 Cell, Steel Tank.
1—#18 Denver Sub-A, 6 Cell, Wood Tank.
1—#12 Denver Sub-A, 6 Cell, Steel Tank.

BALL MILLS
1—6′ x 4′ Marcy.
1—4′ x 5′ Marcy.
1—6′ x 7′ Allis-Chalmers.

PUMPS—SAND
6—2″ Wilfleys—Rubber Lined—Motorized.
1—1½″ Denver Equipment, Vertical—Motorized.

CONCENTRATING TABLES
4—6′ x 16′ Deister Type, New Rubber Decks, Motorized.
1—6′ x 16′ Butchart, New Rubber Decks, Motorized.
1—#13-B Laboratory, size 50″ x 24″, Motorized.

AIR COMPRESSORS
1—8¾ x 4¾ x 5 Chicago-Pneumatic, V-belted to a D-4400 Caterpillar Diesel Engine.
2—445 Cu. Ft. Imperial Type 10, with 75 HP, AC Motors.

BULLETIN NO. 9 AND UTAH LIST SENT UPON REQUEST

Florence Machinery & Supply Company

C. J. Parrish, Mgr., Suite 904, Equitable Bldg., Denver 2, Colo. Phone: Al. 2803

FOR SALE

1 30-ft. CONVEYOR with 2-ft. belt and electric motor.
2 2-cell PAN AMERICAN JIGS, 42″ x 42″ with 10 hp. electric motor.
1 BENDELARI, 24″ x 24″ CLEANUP JIG. No motor.
2 Office of Civilian Defense CHRYSLER WATER PUMPS. 500 gal. per min. at 120 lb. pressure (portable).
2 PORTABLE MAGNETS — gasoline powered.
1 KOHLER LIGHT PLANT, Chrysler powered, 15 kw. 127/230 volts, 3 phase, 60 cycle.
1 EAGLE turnscrew LOG WASHER or scrubber with electric motor.
1 RAY OIL BURNER.
1 WILLIAMS OIL-O-MATIC BURNER.
3 THERMO-COUPLES.
1 CENTRIFUGAL FAN.
1 VIBRATING SCREEN with screens and motor.
1 Rotary electric drive OIL-FIRED FURNACE.

And various General Electric and Cutler-Hammer linestarters, electric wire, wheelbarrows and hand tools.

FRANK R. SHORT
Rm. 2230 — 111 Sutter St.
San Francisco 4, Calif.
Ph.: Yukon 6-5868

MINE HOIST: All steel construction, single drum, 8″ dia., 3700 ft. 1½″ rope, single line pull capacity 73,000 lbs. with herringbone gears to operate at a speed of 200 to 600 FPM; meter 400 H.P., 580 RPM, 3 phase, 60 cycle, 2200 volt, complete with all control equipment. Condition like NEW. Located in California.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW):
1—Piece 1014 ft.
1—Piece 1017 ft.
1—Piece 268 ft.
6 ply, 42 oz. duck, 7/32″ top cover, 1/16″ bottom cover, on original reels.

ALL NEW, NATURAL RUBBER. With or without mechanical parts.

TURBO GENERATOR: Curtis Steam Turbine driven Generator Unit, 600 KW, 5 stage, 200 lbs. steam pressure. 3600 RPM, with condenser, General Electric Generator, 750 KVA, 2300 volt, 3 phase, 60 cycle, with exciter, piping, valves, etc.

PUMP: Worthington 40 H.P. steam driven Centrifugal Pump 300 lbs. steam pressure, 3550 RPM, with steam regulator. Complete, in new condition.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE, PA.
Phila. Phones: Madison 8300 - 8301

Rotary Kilns—6½′ x 70′ & smaller.
Rotary Dryers—3′ x 30′—4′ x 30′—6′ x 40′—5½′ x 50′—6½′ & 6½′ x 60′ & 8′ x 70′.
Tube & Ball Mills—6′ x 9′—5′ x 22′—5½′ x 10′.
Fuller-Lehigh Mills—22″—47″ & 52″—Bradley Mills.
Jaw Crushers—From 10″ x 6″ up to 38″ x 24″.
Crushing Rolls—From 16″ x 10″ up to 72″ x 20″.
1—7″ Newhouse Crusher, latest type.
Sturtevant Rotary fine crushers No. 0—No. 1—No. 1½ and No. 2.
Ring Roll Mills—Sturtevant No. 1—No. 2
15′—16′ & 18′ Hereschoff furnaces.
9′ x 15′ Bruckner roaster.
Gyratory Crushers, No. 3 and No. 12.
8′—14′ air separators.
Magnetic separators—jigs—screens—Classifiers and thickeners.
5′, 6′ & 7′ dia Rod Mills.
Mine Hoists.
One 4 roll Raymond Mill, low side.

W. P. HEINEKEN
227 Fulton St., N. Y.

1—300 Ton Caldwell Horizontal Wheel Press.

1—Niles Bement Pond Wheel Lathe. Will turn up to 42″ Wheels.

Write or Wire for Details

FRANK M. JUDGE & COMPANY, INC.
7010 Empire State Bldg.
New York 1, N. Y.

---

300 ft. 6″ pipe. 3000 feet 3 inch pipe.
100 tons 12 to 35 pound mine rail.
One 1,500 CFM Ingersoll Rand Imperial type 10 compressor.
24 x 42 steel frame building.
Double drum air hoist.
Mine Timber Framing Saws.
Transformers, 200 KVA. Down large air receivers.
Box 609 **Yerington, Nevada**

CLEARANCE

Half Price Sale

New Parts for CLECO

Rock Drills—Wagon Drills

(While they last)

H6 Sinker	C10 Breakers
H77 Sinker	D12 Drifters
H10 Sinker	Wagon Drills
SS22 Stopers	S11 Stopers

BIG 3 WELDING EQUIP. CO.
El Paso—P. O. Box 352—Texas

FOR SALE OR TRADE

New Sullivan 22-HD core drill and FM 3x4 duplex pump, mounted on trailer, 30" hydraulic chuck, hydraulic operated mast, barrels bits and rod for B and N drilling. A complete unit, inventory over $11,000.00. Will sell for 70% of inventory or trade for Bucyrus-Erie 24-L churn drill or 22-W churn drill and cash.

J. D. JUDD & SON
Shullsburg, Wisconsin

Portable POWER WINCH

Save 75% on Brand New

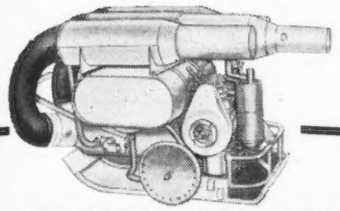
Your Price $289.50 F.O.B. Cinn.

with 2 cyl. 11 H.P., Waukesha Gasoline Engine. Cost Uncle Sam $1150 each.

For coal mines, Building contractors, water well drillers, tank builders, farmers—wherever a real winch is needed. Drum carries 400″ of ⅝″ cable or equivalent in other sizes (cable not furnished). Will handle 5,000-6,000 lbs. at 50 ft. per min., or 3,000 lbs. at 100 ft. per min., 2,500 lbs. at 167 ft. per minute or lighter loads much faster. Free wheeling drum. Hydraulic brake. Standard automotive parts and other available parts from winch manufacturer. Motor worth $180. Similar winches sell for $1,600. Guar. brand new with tools, parts list, 32 acces. in all. Ready to ship. $289.50. Net wt. 1,070 lbs. Shipping wt. 1,650 lbs. Net size about 41″x42″x64″. Folder on request.

FEDERAL IDENTIFICATION CO., Dept. E-1, 1715 W. Grand Ave. Ph. 3-3892 Okla. City, Okla.

SALE



PORTABLE HEATERS

Complete with flexible ducts. Excellent operating condition guaranteed.

Especially Adaptable for

MINE USE

STEWART-WARNER portable, powerful 100,000 BTU gasoline-burning Heaters complete with turbine type blower and 1½-hp. air-cooled, ball-bearing engine.

PORTABLE SELF-POWERED MANY PURPOSE HEATER

HEATING—Mills, Bunkhouses, Dry Rooms, Large Boarding Houses, Shops, Sheds, Warehouses, Buildings Under Construction, Spot Heating, etc.
THAWING—Thawing Frozen Ore, or Preventing Freezing in Ore Bins. Thawing Frozen Areas, Machinery, Pipe Lines, Tanks, etc.
DRYING—Drying Concentrates or Ore in Conjunction with Tumbler. Dry Wet Ore in Bins; Dry Plaster, Paint, Mortar, etc.
PRE-HEATING—Engines, Tractors, Trucks, Equipment, etc.

ORIGINAL COST $583.00
SALE PRICE $195.00

Electric Heaters also in Stock.
Send for Literature

BERNSTEIN BROTHERS
Since 1890
PUEBLO Dept. M-4 COLORADO

BARGAINS — FOR SALE

100 KW Diesel Engine Generator Sets

15—100 KW, 250/275 v. and 120/240 v. D.C. Delco Generators dir. con. to 150 HP., Model GDB-8, 5½x7, 8 cyl. Superior Diesel Engines, electric starting with muffler, power panel and accessories. Practically as good as new—Only Used for Spares.
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Duquesne Electric & Mfg. Co.
Pittsburgh (6) Pa.

BOILERS

10 to 1000 H. P.
NEW-USED RECONDITIONED
Steam, Gas and Electric Power Equipment
J. PARKER THOMPSON CO., INC.
507 FIFTH AVE., NEW YORK CITY
MURRAY HILL 7-6547-8-9

1—New 18x32 solid steel frame jaw crusher.
1—Factory re-mfgd. 18x32 solid steel frame jaw crusher.
1—6'x12' and 6'x16' revolving screen.
A number of 6' manganese steel screen sections 2¼" perf—at a substantial saving.

ACME ROAD MACHINERY CO.
FRANKFORT NEW YORK

"HP" guarantees every machine sold

THYLOX LIQUID PURIFICATION PLANT—Capacity 60 million cu. ft. per 24 hours.
GAS PURIFICATION SYSTEM—Complete with tanks, valves, piping; capacity 2,000 to 16,000 cu. ft. per hour.
FULLER-KINYON SYSTEM — Type H5 Pump with Motor and Feed Hopper, hi-low system, 250' 4" pipe and 8—3-way motorized valve.
CHRYSLER AIRTEMP — 2—NEW 75-ton units complete with Trane Evaporative Condensers, Fans and Motors.
DRACCO AUTOMATIC FEEDER UNIT—NEW, type S, 3 compartments with TEFC motors, motor driven airtimer and exhauster. Hoppers, discharge boxes and cyclones—all stainless steel.
JEFFREY SWING HAMMER PULVERIZER—36" x 24", Type A-2, with 50 HP TEFC Motor.
AIR COMPRESSORS—8—C.P. 12" x 10" NSB, 266 CFM, 100# pressure.
OLIVER CONTINUOUS FILTER—5'4" dia., 6' face, serial #8823, complete with all accessories.
AUTOCLAVE—Vertical, jacketed, stainless steel lined, 6'0" x 7'—11⅞" x 11/16" shell, 40# W.P., ASME U-69.

BLENDERS
3—NEW Conical copper 2.7 cu. ft. cap., 20" x 20", with reducer and motor.

BLOWERS
4—18,000 CFM 7¾" SP V-Belted Type SE, #12 American.
6—10,000 CFM 1.9" SP Everdur Blades, Type R Buffalo.
1—5,750 CFM 7½" SP American.
3—3,300 CFM ¾" SP with motors.
6—1,200 CFM 13.9" SP with motors.
3—1,000 CFM ⅜" SP with motors.

CONVEYORS—BELT
30" Troughing, 80' centers, stainless Belt with reducer & 5 HP TEFC motor.
24" Flat 30' centers and drive.
24" Troughing, 32' centers and drive.
24" Troughing, 20' centers and drive.
18" Troughing, 22' centers and drive.

DRYER
1—NEW Proctor-Schwartz Conveyor.

ELEVATORS—BUCKET
46' centers, single 3½"x6" pitch chain, 7"x5" Buckets, steel encased with drive.
48' centers, single 825 chain, 14"x7", MI Buckets, steel encased.
68' centers, single 825 chain, 10"x6", MI Buckets, steel encased.

FILTERS
1—#12 Sweetland, 72 leaves, 2" spacing, 37" dia., 145" long, 1,000 sq. ft. filter area.
1—Celeron, 36", 4-eye, washing type, 52 chambers, 60# pressure.
2—NEW Shriver, rubber covered, 24", closed delivery, 4-eye, 3.61 cu. ft. cap., manual closing.

MILLS
Stedman, 4-cage, 36" with motors.
Mikro Pulverizer, #2 belt driven.
Day 3-roll 16"x40" Ink Mill.
Raymond 3-roll, low side.

MIXERS
Blystone, heavy duty, 4'x6' with motors.
Readco #1½ SA, motor driven.
Champion #2 Type E motor driven.
Champion #3 Super Ajax, motor driven.

MOTORS
Large quantity NEW Gear Motors and X.P. from ½-75 HP.

PUMPS
Frederick Iron & Steel Co. 8" DSV-SM, 2,500 GPM, 150' H., comp. with 125 HP, TEFC Motor and Control Panel.
Chicago 4"x4" 500 GPM, 88' H., C.I.
Allis Chalmers, 2½"x2", 200 GPM, 140' Head.
F.M. 3"x3", 300 GPM, 100' H.
Deming, bronze, 3"x2", 150 GPM, 50' H.
Duriron, 4"x3", 290 GPM, 90' H.
Duriron, 3"x2", 300 GPM, 108' H.
Wilfley, S.S., 3"x2½", 150 GPM, 100' H.

REDUCERS
1—DeLaval, 70 HP, 1,800 RPM, 14½-1.
2—Cleve., 55 HP, 1,800 RPM, 3½-1.
2—Cleve., 50 HP, 1,800 RPM, 5-1.
1—Farrell, 20 HP, 1,200 RPM, 10-1.
1—Cleve., 20 HP, 1,800 RPM, 6-1.
1—Phila. vert., 15 HP, 1,800 RPM, 24½-1
1—Cleve., 15 HP, 1,800 RPM, 5¼-1.
1—Phila., 10 HP, 1,200 RPM, 67½-1.
1—Link Belt, 10 HP, 1,200 RPM, 16-1.
8—Saco, 10 HP, 1,200 RPM, 10-1.
(Other Reducers available from 1½ to 7½ HP.)

SEWING MACHINES
Bagpak, frame 152, type EL with motor driven sewing machine, double chain drive, 13"x8" Slat Conveyor.
Bates, bag, type H.

TANKS
42,000 gals. 12'6" dia., 45'9" high.
5,000 gals. hor. 6'x1"x24'x½".
5,000 gals. hor. 6'x23'7"x5/16" (NEW).
4,000 gals. hor. 6'x20'x5/16" (2 NEW).
3,500 gals. hi-chrone 77"x10'x⅜".
2,300 gals. hor. 5'x15'x½".
750 gals. vert. 5'x8'x½" open.

WELDERS
300 and 400 amps., G. E. & Hobart.

MISCELLANEOUS
ABSORBER — 260,000 gals., 22' dia., 90' high, vert.
BOILER PLANT—Complete, Erie City, 604 HP, 180 PSI, ASME code and Natl. Board. Pulverized coal fired, with coal bin and bucket elevator.
PIPE — HAVEG — All sizes.
SCRUBBER TOWER — 16'x39'x⅜" shell and dome, ½" bottom.
VALVES — Stainless steel, all sizes. Rubber lined, 1½" to 6".
WEIGHING MACHINE — Automatic, model N-P, weighs from ¼—3#w/motor.

Heat and Power Co., Inc.
70 PINE STREET DIGBY 8-0373 NEW YORK 5, N. Y.

DIESEL ELECTRIC POWER FOR IMMEDIATE DELIVERY

A PARTIAL LISTING OF OUR INVENTORY
ALL ITEMS NEW OR RECONDITIONED

Generator Sets:

H.P.	MAKE	FUEL	KW	RPM	GEN.	PH.	CYL	VOLTS
510	Cooper–Bessemer	Diesel*	350	900	PM	3	60	2400
112	Caterpillar	Diesel	75	900	AC	3	60	220/440
90	Buda	Diesel	50	1200	Smith	3	60	220/440
56	Buda	Diesel	30	1800	Century	3	60	220/440
50	Cummins	Diesel	28	1200	FM	3	60	120/208
56	LeRoi	Gas**	25	1200	West	3	60	120/208
65	Hercules	Gas	25	1800	Masters	3	60	120/208
32	Buda	Gas	7.5	1200	Kato	3	60	120/208

Oil Transformers:

KVA	MAKE	PRIMARY	SECONDARY	PH	CYL
125	GE	2400	240/480	1	60
150	Penn	2400	120/240	1	60
200	Penn	2400	120/240	1	60

*This unit can also be furnished as Gas-Diesel.
**This unit can also be furnished as Natural Gas or Butane.

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DEPT. C **15712 S. LEAHY AVE.** **BELLFLOWER, CALIF.**
Phone: Torrey 7-3514

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Stationary — 100 CFM and Up
Also 2 Stage Gasoline Portables

L. W. BAUER
North Bergen, N. J.

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Metallurgical Process Division,
Saratoga Laboratories, Inc.,
Saratoga Springs, New York

Sludges and ores bought outright or recovery processes developed under contract.

THREE MAJOR MINING & MILLING PLANTS FOR SALE

Items too numerous to list.
Write for inventory.

22" conveyor belt installation complete, 200' long.
Lathe—bolt threading machine — drill press.
Ingersoll-Rand #50 sharpener, complete.
30"x13" Farrel jaw crushers.
Three Marcy 86 ball mills, complete with motors and controls.
Three 5x8 ball mills, also classifiers, drives and controls.
9—standard size Wilfley tables.
Bargain!! M.S. flotation cells, wooden cells, steel mechanism, 10 banks.
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2—Dorr thickeners, 25' x 8', all complete.
3—Filters, 12' x 3½"—12' x 9'—12' x 4', Good shape.
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70 KVA diesel generator set.
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500 H.P. mine shaft hoist.
4—DA 35 power feed drifters, reconditioned.
75 Marcy ball mill, motor and drive.
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25—8-ton 24" gauge cars.
70' bucket elevator, good condition.
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Allis Chalmers large rolls, 55" x 24", complete.
9-mile aerial tramway, complete.
50 assorted motors, 3 H.P. up to 200 H.P.
Generators, 50 KW, 35 KW, 7½ KW, 5 KW.

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Tramway—3500 ft.—1100 lbs. buckets, excellent condition, $10,000, located Central City, Colo.

WANTED

1500 ft. center conveyor built, yard wide for incline.

NEED

3 very large jaw crushers.

WANT

Large low grade ore bodies, any metal, Anywhere—also diamond bearing property.

CHAIN O MINES
228 So. Wabash Ave. **Chicago, Ill.**

FOR SALE

1 Telesmith size 32 Reduction Crusher Complete with V Belt pulley and belts Extra Mantle, concave rings, babbitt sleaves and roller bearings. This machine has been reconditioned, but is not suitable for our work.

1 Sullivan Class WJ Compressor, size 12 —7½x10. Piston displacement 248 C.F.M. at 100# Pressure. Now operating but available immediately.

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2—9 ft. x 160 ft. Allis-Chalmers Rotary Kilns.
1—6½ ft. x 50 ft. Rotary Cooler.
2—Rotary Kilns, 6'3"x120'.

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Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

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Diamond Drill Equipment
For Sale

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Classified Advertising Division

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New York 18, N. Y.

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(12) Belted, 360, 676, 870, 1,200 ft.
(6) Electric, 1,300, 1,500, 1,722, 2,000, 5,000 ft.
(14) Gasoline, 110, 160, 220, 310—370 ft.
6 Diesel, 105, 315, 420, 603, 1,000 & 1,500 ft.
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35-ton Plymouth Diesel, Std. Ga.
4—65-ton Whitcomb Std. Ga. Diesel.
12—20- and 30-ton Plymouth St. Ga. Gas.
4—14-ton Plymouth 36 Ga. Diesel.
80-ton G. E. Diesel Electric St. Ga.
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100—40-ton Box Cars. 25—50-ton Flats.
50—50-ton Gondolas.
150 Dump Cars, 2 to 30 yd.
VIBRATING SCREENS:
7—Hummer 3x6, 4x5, 4x8.
5—Link Belt, 4x8, 4x10, & 5x12.
ROTARY KILNS:
5'x24', 7'x40', 6'x60', 7'6"x125', 8'x160'.
ROTARY DRYERS: Direct Heat:
Double Shell: 5'x26", 5'x30'.
5'6"x60', 30"x45'.
Single Shell: 5'x30, 6'x40, 6'x50, 6'x60, 7'x60, 8'x120.
Indirect Heat: 24"x20, 5x30, 6x40.
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6—8,000, 10,000 gal. Car Tanks.
26—5,000, 65,000, 8,000, 15,000, 25,000, & 30,000 gal.
2—74,000 Bbl. Cap.
100,000 gal. tank on 100' tower.
SHOVELS—DRAGLINES—CRANES:
1 Yd. P&H—600 Gas Crane, 50' Boom.
1½ Yd. 700 B—P&H 60' Boom Gas Dragline.
2 Yd. 42B E. Steam Shovel.
6 Yd. Bucyrus 200 B Stripper Shovel.
4 Yd. Marion Electric Shovel.
2 Yd. Marion Electric Shovel.
3 Monighan Diesel Dragline 3W & 4W.
4—1 & 1 Yd. Bucyrus Elec. Shovels.
3—20 & 25 ton Locomotive Cranes.
MINE LOADERS—SHOVELS:
8—Conway Models, 280, 30, 50, 60 & 75.
3—Gardner Denver GD9H.
3—Elmco Findley Model 12B & 21.
2—Nordberg Car Loaders.
FINE REDUCTION CRUSHERS:
2—4½ ft. Symons Cone.
No. 1 Stunteven Ring Roll Mill.
7—Symons 2, 3, 4 & 5 ft. & 7 ft.
11—Kennedy S19, 25, 37, & 49.
7 In. and 10 In. Newhouse.
10 In. Allis-Chalmers McCully.
2—Traylor 4½x27 Bulldog.
5 In., 6 In., 8 In., 20 In. Traylor.
28 in. Traylor TY.
FINE JAW CRUSHERS:
4x46, 6x20, 8x12, 3x36, 9x16, 9x26, 10x24, 10x30, 10x36, 10x42, 13x30, 15x36, 15x38, 10x42.
COARSE JAW CRUSHERS:
5x10, 6x12, 7x9, 7x10, 10x12, 9x16, 9x18, 10x20, 12x18, 12x20, 12x22, 12x24, 12x26, 14x24, 13x10, 15x30, 15x33, 18x32, 18x36, 24x36, 30x36, 30x48, 42x48, 50x84, 60x84.
BALL MILLS:
5'22" Tube Mill Flint Lining.
6'x6' Herman Ball Mill.
3'x36" Hardinge Ball Mill.
5½'x20' Smidth Tube Mill.
8'x30' Hardinge Type A Mill.
4'x12" Smidth Tube Mill.
6'x12' Marcy Rod Mill.
10'x48" Hardinge Ball Mill with 300 H.P., 2,300 V. Motor.

Mine Equipment Bought and Sold

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7000-ft. # 4-3/ conductor 49-strands Neoprene jacketed Portable Cable with shielding over each conductor and ground wires, type SHD, for operation at 7,500-Volts or less, on 1,000-ft. reels, priced substantially below present market.

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Six cell unit Morse Weinig Flotation cells, 60 cu. ft. capacity, Electric Motors and Blower, $1,200 00. 6 H.P. Fairbanks-Morse Hoist, $375.00. SW Twin Cells, Wood, Electric Motor, reconditioned, 30 cu. ft. capacity, $375.00. 90 KW, 1,800 RPM, 440 volt generator with built-in exciter, $1,000.00. '41 Mercury Truck Motor Power Unit with Twin Disc clutch take-off, $400.00. All at easy accessible mine in Arizona.

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for IMMEDIATE DELIVERY *of* RUBBER PRODUCTS

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NEW GUARANTEED

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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom Covers	Width	Ply	Top-Bottom Covers
48"	8	1/8" — 1/16"	24"	4	1/8" — 1/32"
42"	5	1/8" — 1/16"	20"	5	1/8" — 1/32"
36"	6	1/8" — 1/16"	20"	4	1/8" — 1/32"
30"	6	1/8" — 1/16"	18"	4	1/8" — 1/32"
30"	5	1/8" — 1/16"	16"	4	1/8" — 1/32"
26"	5	1/8" — 1/32"	14"	4	1/16" — 1/32"
24"	5	1/8" — 1/32"	12"	4	1/16" — 1/32"

Inquire For Prices — Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices — Mention Size and Lengths.

ENDLESS "V" BELTS

"A" Width All Sizes —
"B" Width All Sizes —
"C" Width All Sizes —
"D" Width All Sizes —
"E" Width All Sizes —

Sold in Matched Sets.
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FIRE HOSE

APPROVED SPECIFICATION HOSE EACH LENGTH WITH COUPLINGS ATTACHED

I.D. Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

AIR HOSE

I.D. Size	Length	per Length	Universal Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 Pair
¾"	25 "	7.50	1.50 Pair
	50 "	15.00	1.50 Pair
1"	25 "	10.00	1.50 Pair
	50 "	20.00	1.50 Pair

LARGER SIZES ALSO AVAILABLE
All Prices—Net — F.O.B. New York

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I.D. Size	Length	per Length	I.D. Size	Length	per Length
¾"	25 feet	$4.25		35 feet	$10.50
	50 "	8.00		40 "	12.00
1"	25 "	6.25		50 "	15.00
	50 "	12.50	1½"	25 "	10.00
1¼"	25 "	7.50		35 "	14.00
				50 "	20.00

Each Length with Couplings Attached

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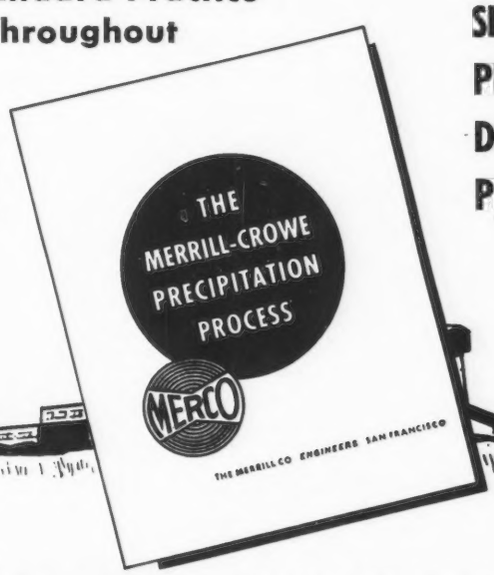

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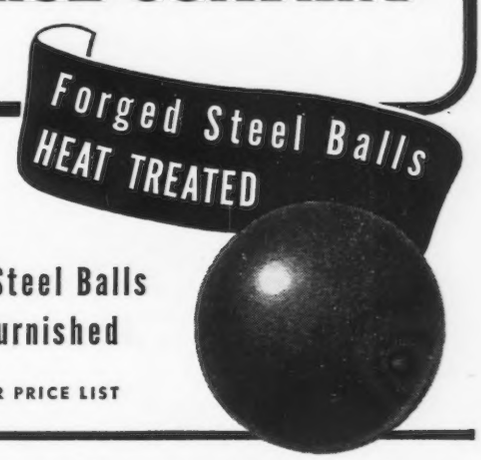

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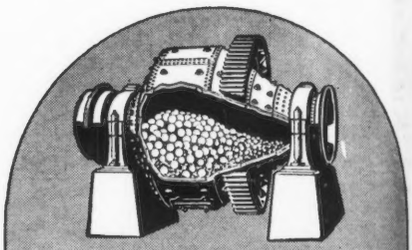

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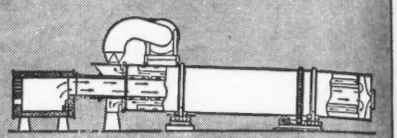

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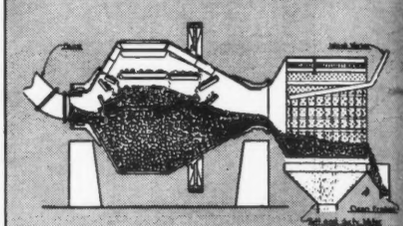

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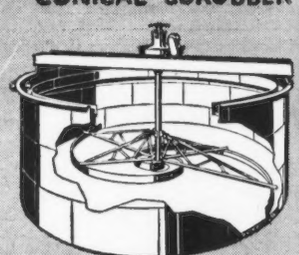

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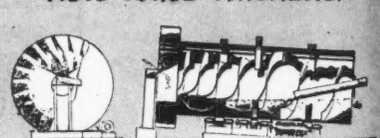

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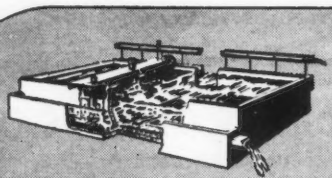

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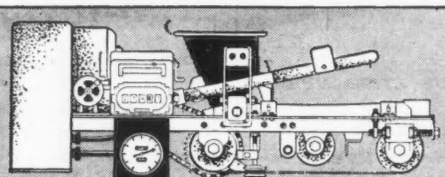

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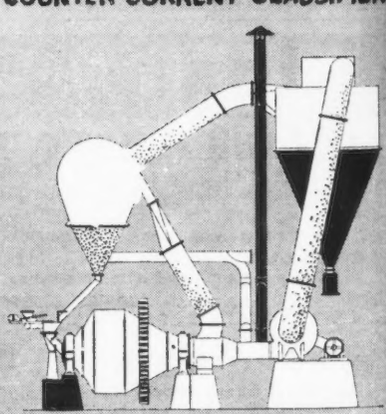

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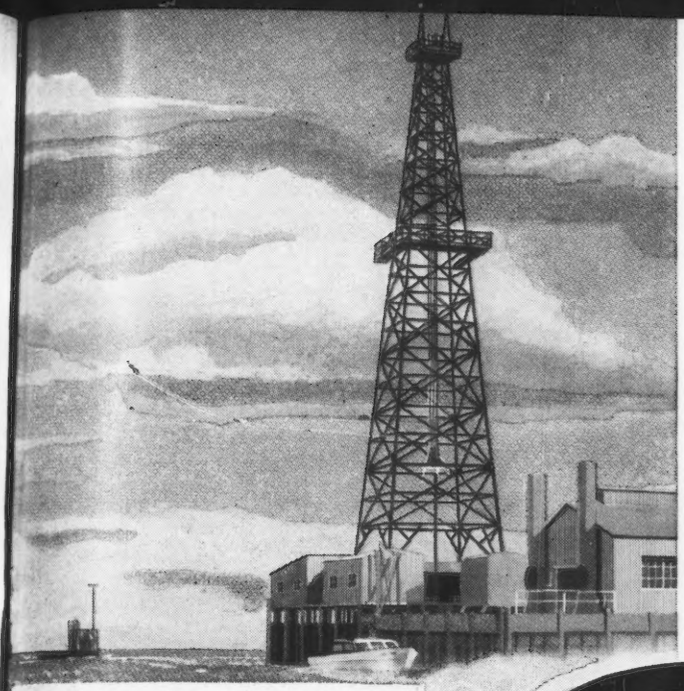
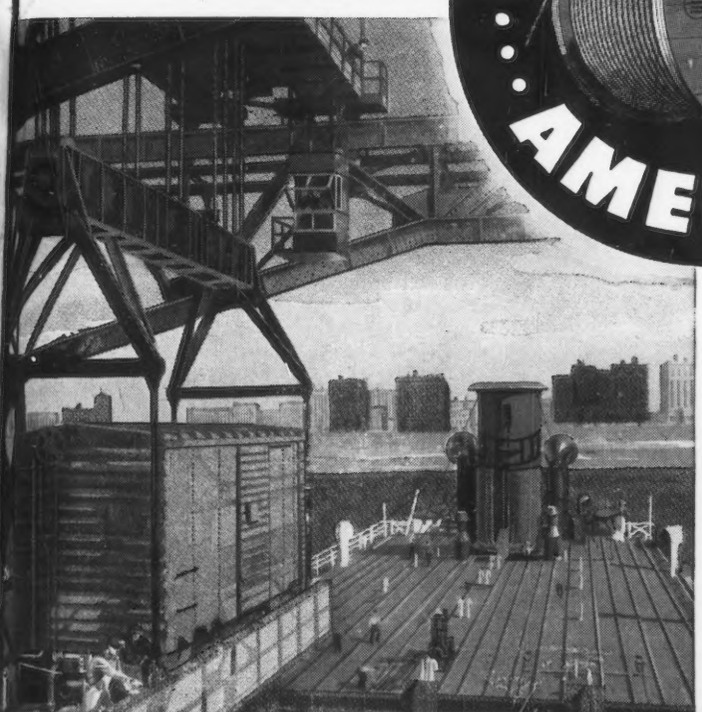


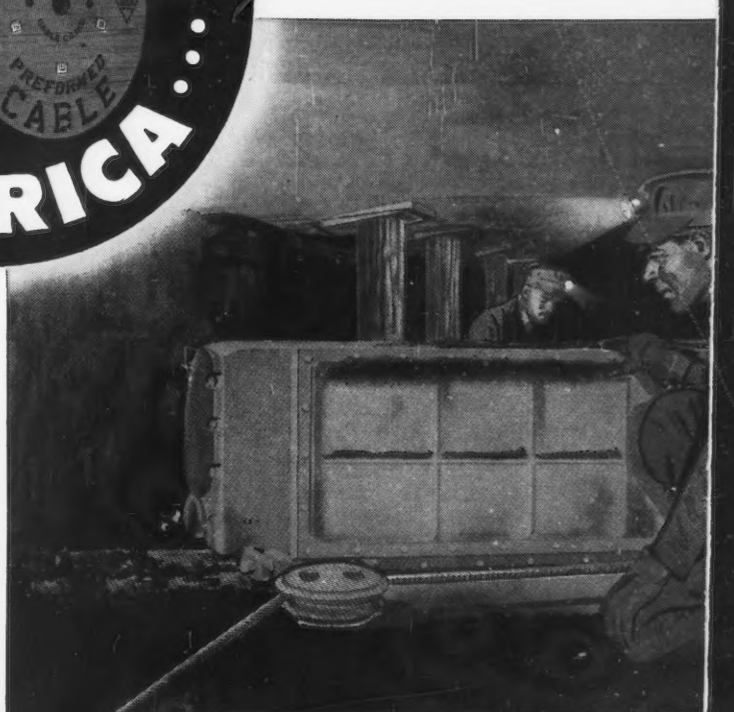
In Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.

Breaking up hard-packed earth is the first step in grading for water drainage in Nebraska. These earth-breaking machines put constant gruelling strains on the wire rope. Here again, TRU-LAY Preformed gives longer, lower cost service.

ALL AROUND AMERICA



Hoisting a completely loaded box car onto a Seatrain for over-water journey from Edgewater, N. J., to Texas City. TRU-LAY Preformed is hard at work every day on thousands of huge overhead traveling cranes like these—giving good service.



Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

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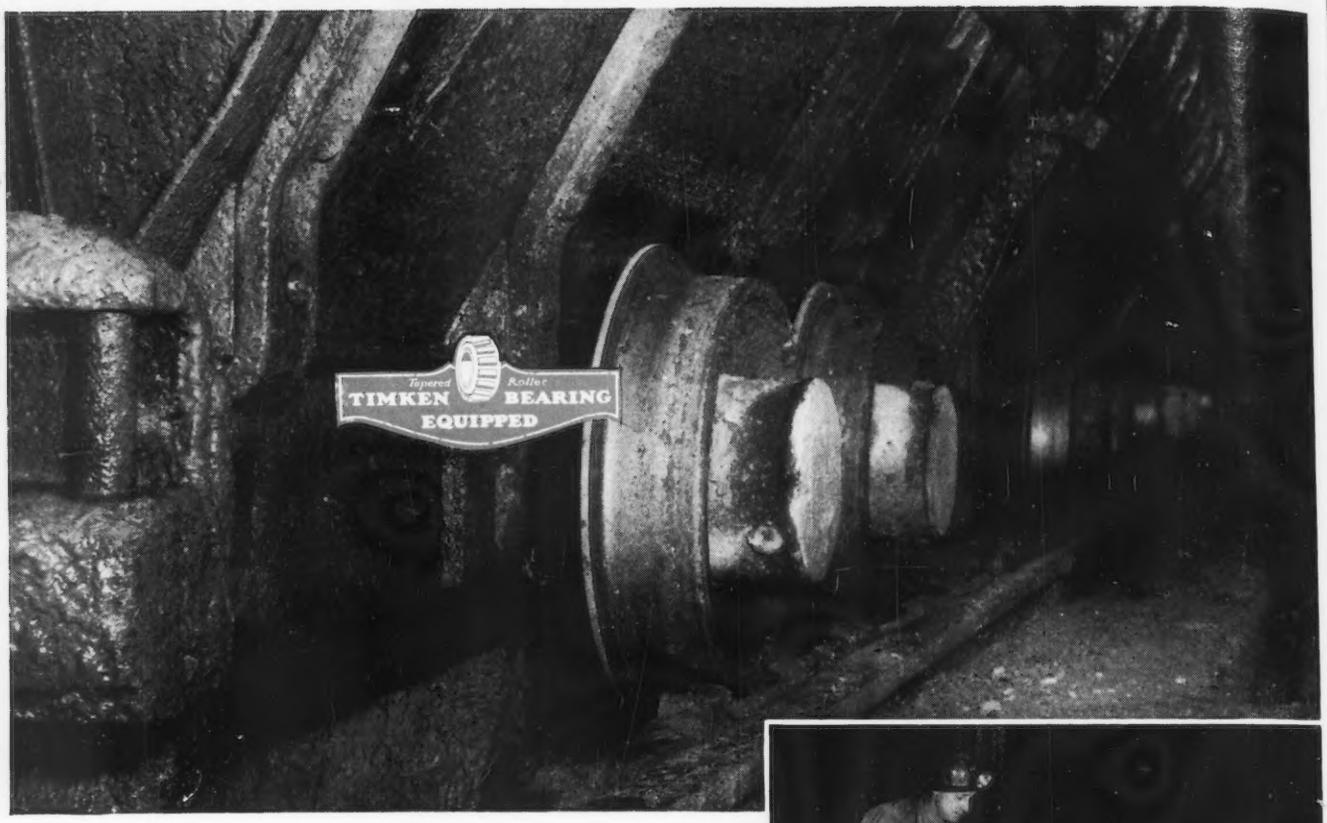

Beating the BUMPS at a Western Copper Mine

Superintendent about to examine a Timken bearing removed from a car after a long period of "beating the bumps".

They had an ore-dumping problem at this mine some years ago; couldn't get the wet, sticky ore out of the cars without a lot of banging and scraping — a time-wasting procedure.

The problem was solved eventually by welding sizable chunks of iron to the track over the skip pockets; you can see them plainly in the photograph. The resultant severe jolting of the cars loosened the tenacious ore, permitting it to dump freely.

Then came the question: could the mine car bearings take such rough treatment? They could, did and have been taking it ever since. They are Timken tapered roller bearings.

Despite the terrific punishment these bearings take, the mine superintendent reports excellent service in all the years of operation.

This western copper mine has 170 Timken bearing equipped automatic bottom-dumping cars in service. These are of standard design and manufacture.

More than a thousand mine operators know it pays to operate mine cars equipped with Timken bearings. It will pay you to have them in your new cars.

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ENGINEERING AND MINING JOURNAL

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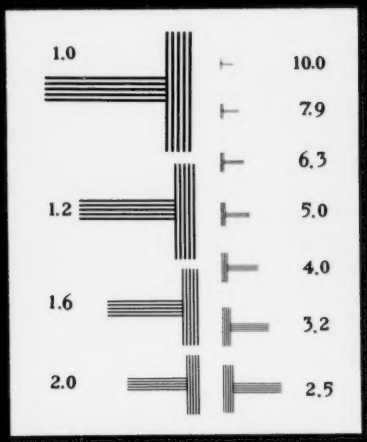
UNIVERSITY MICROFILMS
ANN ARBOR, MICHIGAN. 1950

RESOLUTION CHART



100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and 100 ⁄ 20 = 5.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and 7.9 x 5 = 39.5 lines per millimeter recorded satisfactorily. 10.0 x 5 = 50 lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.

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